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THE METAMORPHOSES OF STREPTOCOCCI INTO SPORE-BEARING RODS AND INTO FILTERABLE FORMS

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INTRODUCTION

In an earlier study (1926) Evans and Freeman described a streptococcus obtained from the mesencephalon and heart blood of a case (E. H.) of epidemic encephalitis. It was of the alpha type, producing a greenish zone around the colonies on blood agar. We mentioned a spore-bearing rod which was cultivated from the filtrate of emulsion of the brain from this case, and which was also encountered frequently throughout the studies on the streptococcus. In another paper (1927) I reported finding this same type of spore-bearing rod as well as the streptococcus in the five strains of herpes virus and in the single strain of encephalitis virus studied. In the present paper I propose to describe the rod form and to present evidence showing that the rod, the streptococcus, and a filterable form are different phases in the life history of the same organism. There will be no discussion as to what may be the relationship of this organism to the diseased condition in which it is frequently found.

The term mutation can not be applied to the transformations which occur in the organism under consideration, for this biologic term is used to describe irreversible changes. The transformations described in this paper occurred in every strain studied, and they were reversible; hence the various forms are to be regarded as stages in the cycle of an organism with a complex life history. The biologic term "metamorphosis" seems applicable to the transformations which occur in this organism.

It has been demonstrated repeatedly in the many studies on bacterial variability by numerous investigators that changes in form as well as in cultural, biochemic, and antigenic properties may occur in strains of bacteria admittedly pure. No attempt will be made in this paper to summarize the evidence against the monomorphic theory. There will be cited only some of the most important of those works which bear directly on the two kinds of transformations which streptococci undergo in brain tissue or in the first generations in culture media after a prolonged sojourn in brain tissue, as shown in this paper.

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Rosenow (1922) was the first investigator to observe the filterability of the streptococcus cultivable from encephalitic material. He had previously (1916) noted the filterability of the streptococcus cultivable from poliomyelitic material. Rosenow's observations on the streptococcus of encephalitis were confirmed by the writer (1926, 1927). Later Hadley, Delves, and Klimek described a method of cultivation by which several species of common pathogenic bacteria were able to enter a filterable stage of development. They reported success in cultivating the greening streptococcus from two glycerolated samples of herpes-encephalitis virus, and also from the filtrate of one of them.

Among the French investigators, Handuroy and Lesbre reported that, by a special method of cultivation, streptococci of the hemolytic or nonhemolytic type could be reduced to filterable forms, from which the bacterial forms developed again. Their observations were soon confirmed by Urbain.

Having been found in the filterable state by so many investigators, it appears now to be established that, under certain conditions, streptococci of the alpha and beta types may occur in forms small enough to pass through filters which hold back bacteria of the sizes found when grown on ordinary media. The other transformation of streptococci described here, the complete transformation to pure cultures of spore-bearing aerobic rods, has not been reported by previous investigators, although several investigators have noted the transient appearance of heterologous forms in their cultures of streptococci or *B. subtilis*. Sédallian and Goumand described bacillary forms as transitional stages in the evolution of streptococci from the filterable to the nonfilterable phase. Handuroy and Lesbre also noted pleomorphic stages before the ordinary streptococcal forms developed from filtrates. Tunnicliff cultivated from convalescing scarlet fever patients bacillary forms which reverted to the typical streptococcus in subcultures; and Frendzlowa and Szymanowski observed *B. subtilis* growing like streptococci in an antiserum.

Of interest in this connection is the extensive work of Cunningham, who has shown that *Bacillus saccharobutyricus*, an anaerobic spore-bearing rod of the soil, can be transformed into an aerobic spore-bearing micrococcus by gradual training under incomplete anaerobic conditions. Cunningham's observations were a confirmation of Bredemann's, made 20 years previously.

Spore-bearing rods are such frequent contaminators of bacterial cultures that they are, as they should be, discarded without thought when they make an occasional appearance. Consequently, no attention has been paid to the transformations which bacteriologists, working with freshly isolated cultures of streptococci, must have observed many times.

In this report of the transformation of streptococci to spore-bearing rods, and of spore-bearing rods to streptococci, due consideration has been given to the possibility of contaminations. Assurance that the changes in morphology were not due to contamination depends in part upon the great number of transformations observed with the possibility of contamination always in mind, and the reversibility of the metamorphosis. The repeated observations of changed morphology would not alone be proof, however, that those changes were due to metamorphosis. The convincing proof was in the pleomorphism of the individual cells of the cultures undergoing transformation, as shown in stained microscopic preparations and recorded in the accompanying photographs. When sparsely growing cultures were undergoing the transformation from coccoid to bacillary form, or *vice versa*, growing as streptococci on one medium and as spore-bearing rods on another medium, and when the individual cells of the transforming cultures showed distinctly double chains of coccoid bodies within the rods, as in Figures 15 and 16, or diplococci and rods in the same chains, as in Figure 11, there could be no doubt that a metamorphosis was actually occurring.

The observations recorded in this paper were made several years ago, and the conclusion that streptococcus and rod and filterable forms are all phases in the life cycle of one organism was stated in a previous publication (1929).

It is to be noted that certain conditions are necessary to bring about the transformations. It appears that in the body the germs exist in filterable form, or as highly pleomorphic bacteria. (See figs. 1 and 12.) It is only with difficulty that the forms existing in the body can adjust themselves to growth in ordinary media; and during the first few days of incubation, before complete adjustment has been made, there is a wavering from one form to the other. Once established on ordinary media, the one or the other form multiplies indefinitely without variation.

SOURCES OF MATERIAL

As already mentioned, both the streptococcus and the rod forms of the organism were cultivated from all of the six so-called herpes and encephalitis viruses studied. Twenty cases of epidemic encephalitis were also studied. Of these, the rod was cultivated from 11 (from the spinal fluid of 4 and from the blood of 7 patients, and from the brain taken at necropsy in 3 cases). The streptococcus was cultivated from 5 of the 20 cases (from the spinal fluid of one, and from the blood of 3 patients, and from necropsy material in 2 cases—from the brain of one and from the heart blood of both).

TECHNIQUE

The technique was the same as that described in the earlier papers. Precautions against contamination of culture medium and utensils were carefully observed. For example, the chopped meat medium, made like ordinary beef infusion broth, except that the ground meat was not discarded but placed in the test tubes with the broth, was sterilized at 15 pounds for 1½ hours. The agar used was prepared with beef infusion broth in the usual manner, except that the broth was strained through wire gauze instead of being filtered through cotton or paper. The plain agar is designated vitamin agar. Blood agar was prepared by the addition of 5 per cent rabbit's blood to the vitamin agar. Glucose agar was prepared by adding 1 per cent glucose to the vitamin agar.

The inoculation of a series of agar slopes is mentioned frequently in the description of operations. This was done with a platinum loop or needle, according to the estimated density of growth in the inoculum. The three or four or more slopes of the series were streaked without flaming the loop or needle. If it was presumed that the inoculum was very heavily seeded with organisms, the needle was cleansed by plunging it back and forth in the agar before proceeding to the inoculation of the next tube. It was the aim to have the first slope of the series heavily seeded, and the last slope so lightly seeded that colonies would be well isolated.

Gram-safranin was found to be the most useful stain for this study. Giemsa's stain and carbol-fuchsin were also frequently used.

In the filtration experiments, Berkefeld filters 2½ inches by ⅝ inch were used. The N type was used most commonly, the V type occasionally. In the description of procedures the type will be given whenever the filter is mentioned. When an emulsion of tissue was to be filtered, it was first centrifugated at low speed to get rid of the particulate matter. In order to ascertain the sterility of the apparatus, sterile broth was passed through it before the experimental material was filtered. The filtered broth was planted in meat medium and incubated with the experimental material. Every time that a filter was used, its efficiency was tested by heavily inoculating the material to be filtered with a young culture of *Serratia marcescens* (*Bacillus prodigiosus*). Failure of growth of the test organism was regarded as proof of the efficiency of the filter. Pressure for the filtration was obtained by means of a water pump.

Intracerebral rabbit inoculations were always with 0.25 c c of diluted or undiluted culture introduced through the trephined skull of an anæsthetized rabbit.

FORM OF THE ORGANISM IN THE HUMAN BRAIN AND SPINAL FLUID

It can not be assumed that the forms of bacteria which appear in cultures are the predominant forms in the human body. The organism as it occurs in the human brain is shown in Figure 1. The slide from which this photograph was taken was smeared with the mesencephalon from a fatal case (C. D.), in which death occurred after three weeks of acute illness.

The autopsy was performed 15 hours after death, the body having been kept in a morgue at about 2° C. in the meantime. Four slides smeared with different parts of the mesencephalon were examined carefully. No bacteria were found on three of the slides, but on the fourth slide an area was found with myriads of bacteria in clumps surrounded by scattered bacteria. They appeared as diplococci or as small irregular rods, taking the stain unevenly. From the distribution of bacteria on the slides it is apparent that they were not scattered in the brain tissue, as would have occurred in case of agonal invasion, but they occurred in compact clumps, one of which was broken in preparing this smear. The bacteria seen in Figure 1 were not readily cultivable, for out of four tubes of meat medium planted with pieces of mesencephalon, only one became turbid, and it was not until the ninth day that growth appeared in that one culture. It is unlikely that the bacterial forms shown in Figure 1 are filterable. It seems more probable that the filterable phase of the organism is invisible in the tissue.

In smears of human spinal fluid taken during the acute stage of encephalitis, both diplococci and rods may sometimes be found. Figures 2 and 3 are from different fields of the same smear of spinal fluid taken from a patient (V. D.) on May 14, 1926, when she was in a critical condition on about the eleventh day of illness. Figure 2 shows a rod with a characteristic granule, and also a single coccus, and Figure 3 shows a diplococcus and a single coccus. Single isolated cocci were common in this smear, but few diplococci or rods were found. Two days after the first lumbar puncture a second sample of spinal fluid was taken, when the patient was still in a critical condition. In smears of this sample stained with carbol-fuchsin a few rods could be made out. A small group of them is shown in Figure 4. The bacteria seen in the spinal fluid of patient V. D. can not be regarded as agonal invaders, for the patient recovered, and is still well (1932).

DESCRIPTION OF THE ROD FORM

When grown in culture medium, the rod form is motile; it produces heat-resistant spores which are central or excentric (see Fig. 5); it liquefies gelatin and peptonizes milk. It forms a pellicle on broth. Sugar-free broth is rendered alkaline; acid is produced in glucose and

saccharose broths; it may or may not be produced in lactose broth. On agar the growth is spreading, in irregular, opaque colonies, which usually have more delicate granular margins. Growth at room temperature is less rapid than at 37° C. Staining with Gram-safranin is usually positive, but it may be negative or mottled, varying with the age of the culture or the conditions under which it was grown. The above description applies to all the strains of the rod encountered in this study, but there were quantitative variations between the strains, as, for example, in the strength of the proteolytic enzyme.

CULTIVATION OF THE ROD FORM FROM INFECTED TISSUES

The protocols for the case E. H., from which the spore-bearing rod was first cultivated, show repeatedly the notation "Contaminated with *B. subtilis.*" The first cultivation was in meat medium and on agar slopes planted with filtrate of the emulsified brain. This culture was inoculated into the brains of rabbits for the sole reason that it was thought possible that the "virus" might be present in spite of the supposed contamination. The cultures proved to be highly virulent for rabbits when inoculated intracerebrally, but they were put aside because the idea that spore-bearing rods could be associated with epidemic encephalitis seemed too preposterous to be considered.

As the study of the streptococcus progressed, the rod form was encountered repeatedly. It was occasionally cultivated from the streptococcus form, as described farther on; it was cultivated from additional cases of epidemic encephalitis; and it was cultivated from the six well-known strains of virus received from other laboratories. (Their histories were described in an earlier paper. One strain was from the brain in a case of encephalitis; four strains were cultivated from herpetic vesicles; and one strain was from the spinal fluid in a case of syphilis.) The spore-bearing rods invaded the field of study repeatedly until they could be ignored no longer. In fact it was impossible to carry on inoculation experiments with either the rod or coccus form of the organism without encountering the other, unless the death of the animal occurred within a day or two after inoculation. If the bacterial organism, particularly the rod form, remained in the brain several days, changes of morphology occurred.

TRANSITION FROM STREPTOCOCCUS TO ROD FORM

A record of some of the observed transformations from streptococcus to rod follows:

The rod form was derived from the streptococcus strain P107 (which was isolated from the mesencephalon of case E. H.), in medium planted with the brain of rabbit 168. The rabbit was inoculated intravenously with 2 c c of streptococcus culture P107. This culture had been passed previously through four rabbits by intracerebral

inoculation, causing death within a few hours in each case. Two days after its inoculation, rabbit 168 was found in a lethargic condition, with rigidity and incoordination. On the following day the rabbit died. Both the streptococcus and the rod were cultivated from the brain. The rod proved to be highly virulent for rabbits when inoculations were intracerebral. (Inoculation of 0.25 c c of meat medium culture usually caused death in less than 18 hours.) This strain of rod was passed in pure culture through a series of six animals.

Figure 6 shows what appears to be a transitional stage between the streptococcus and the rod form in a smear of the brain of monkey 39, inoculated intracerebrally with streptococcus P107 after passage through seven rabbits. The monkey died three days after inoculation. The protocol for this animal was given in an earlier paper (1926). In Figure 6 the cocci appear as buds attached to the walls of rods, an arrangement seen again in Figures 8 and 9 and in several other photographs discussed farther on.

Another strain of streptococcus, P95, from nasal washings of case E. H., taken a few days before death, gave rise to the rod form in the third culture generation after passage through two rabbits. After this culture had been held in the ice box for 188 days, subcultures were made in meat medium and on vitamin agar slopes. Both the streptococcus and the rod appeared in the subcultures. Inoculation of the old culture into the brain of a rabbit (No. 248) resulted in symptoms typical of those following inoculation of virulent culture, followed by death. Both the streptococcus and the rod were recovered from the brain. The old culture was allowed to stand in the ice box for 36 days longer, then another rabbit (No. 357) was inoculated intracerebrally. Tremors, incoordination, and rigidity of the limbs developed. The rabbit was chloroformed on the eighth day and the rod in pure culture was recovered from the brain.

The details of the procedure and the observations made in the cultivation of one of the strains of streptococcus from the blood of case V. D. illustrate the intimate association of streptococcus and rod form and the ready conversion of one form into the other in the unstable condition of the organism as it was commonly observed in cultures planted with human tissues or fluids.

On May 16, 1926, eight tubes of meat medium were planted each with about 1 c c of blood. On May 17 the cultures were examined in smear with carbol fuchsin. In the smear from one of the cultures, "t," there appeared to be great numbers of isolated minute coccoid bodies. This culture was passed through a Berkefeld N filter. The filtrate was planted in two tubes of meat medium. On May 19 both tubes of meat medium planted with filtrate were turbid. One culture, "t_1," was covered with a wrinkled pellicle. A smear from this culture showed Gram-positive rods. The other culture, "t_2,"

was uniformly clouded. A smear from this culture showed both Gram-positive rods and Gram-positive diplococci. Cultures "t_1" and "t_2" were each streaked on a series of four vitamin agar slopes. On May 20 the vitamin agar slopes streaked with culture "t_1" showed spreading wrinkled growth typical of the rod form. There was no evidence of growth of the rod form on the series of slopes streaked with culture "t_2," but on all four slopes the growth was typical of the streptococcus. Smears from the first and last slopes of the series showed diplococci with very little pleomorphism. Two tubes of meat medium were planted from isolated colonies on the fourth slope of the series. On May 21 one of the tubes of meat medium planted on May 20 from an isolated colony was turbid. A smear showed only the Gram-positive rods. On May 22 the other tube of meat medium planted on May 20 from an isolated colony was turbid. A smear showed Gram-positive diplococci.

TRANSITION FROM ROD TO STREPTOCOCCUS

A few instances of the derivation of the streptococcus from the rod will be cited as typical of observations which have been made many times.

Repeated instances of the sudden conversion of the rod to the streptococcus with loss of virulence in the transition, as determined by intracerebral inoculation into rabbits, were observed in cultures obtained from the heart blood of case J. P. M. The particular point to be noted in the detailed account given below is that the rod form grew readily in meat medium and could be recovered always from the brains of rabbits which died following intracerebral inoculation, yet it reverted to the streptococcus form whenever an early generation culture was planted on agar, losing virulence in the transition. The observations were as follows:

July 24, 1926—Two tubes of meat medium were planted with heart blood. July 26—Both tubes of meat medium were turbid. Smears showed rods exclusively. Both cultures were transferred to vitamin agar slopes. July 27—A delicate film of minute colonies covered the slopes planted July 26. Smears from the two cultures appeared the same. Although the colonies on agar were typical of the streptococcus, there were no well-formed diplococci to be found in the smears, and very few definite rods were to be found. (See fig. 7.) The organisms were pleomorphic, resembling those seen in the human brain, as illustrated in Figure 1. (The magnification is greater in fig. 7.) It appeared as if the rods had broken down, leaving exposed the granules which had dotted their protoplasm previous to disintegration. Some of the granules were more or less enlarged, and the resulting coccoid bodies could be found occasionally in chains, but in no case had they attained the size of the typical diplo-streptococcus.

Rabbit 557 was inoculated intracerebrally with 0.25 c c of one of the original cultures planted with heart blood, which showed only the rod form in smears. Death occurred in four hours. The rabbit was placed in an ice box. July 28—The brain of rabbit 557 was removed and pieces were planted in two tubes

of meat medium and on a series of four agar slopes. July 29—The meat medium cultures planted with the brain of rabbit 557 were turbid, and smears showed typical Gram-positive rods and a few very small cocci, some of which were in short chains. The vitamin agar slopes showed typical streptococcus colonies apparently in pure culture. Transfers were made to meat medium from well isolated colonies on the fourth slope of the series. July 30—Meat medium planted on July 29 from an isolated colonly was turbid with streptococci in long chains. Rabbit 564 was inoculated with this streptococcus culture. No symptoms developed. August 2—A meat medium culture containing chiefly rods with very few streptococci, which had been planted on July 28 with the brain of rabbit 557, was streaked on a series of vitamin agar slopes. August 3—Although in smear the meat medium culture had shown an abundance of rods with only a few streptococci, the rods did not grow upon the agar, but streptococcus colonies appeared in apparently pure culture. Transfers to meat medium were made from well isolated colonies. August 4—A meat medium culture planted on August 3 from an isolated colony was turbid, and Gram-positive diplococci in chains, with considerable pleomorphism were found in smear. Rabbit 572 was inoculated intracerebrally with the culture. Slight symtoms developed, from which the rabbit made a complete recovery.

Ã£gust 5—Rabbit 573 was inoculated intracerebrally with the original culture (rod form) planted with human heart blood. Five hours after inoculation the rabbit was found dead, and was placed in the ice box. August 6—Meat medium and a series of vitamin agar slopes were planted with pieces of brain of rabbit 573. August 7—The first tube of the series of vitamin agar slopes planted with brain on August 6 showed growth in a delicate film of exceedingly minute colonies. There was no growth on the remaining tubes of the series, although, judging from the infinite number of colonies on the first slope, the second must have been planted with an abundance of organisms. A smear from the film of growth in tube 1 showed very small cocci, many in chains, and also masses of amorphous material dotted with minute coccoid bodies similar to those in Figure 7. The meat medium planted with brain of rabbit 573 was clouded with growth of the rod form. A very few minute cocci were also found in the smear. This culture was streaked upon various kinds of agar to obtain, if possible, a growth of the rod on agar. Series of four tubes each of vitamin agar, glucose agar, and blood agar were planted. August 9—All agar slopes planted August 7 appeared to yield pure cultures of the streptococcus. On vitamin agar and on glucose agar growth was obviously suppressed on all but the first tube of the series; for although the first slope was covered with a delicate film of innumerable colonies, the second slope had only a few well-isolated colonies. On the other hand, there was no evidence of suppression of growth on blood agar, for the second slope, as well as the first, was covered with a delicate film of innumerable minute colonies. Smears were prepared with the growth on the first slope of each series.

The organisms were found to be in the transitional stage, as shown in Figures 8, 9, and 10. Figures 8 and 9 illustrate the morphology of the organisms on vitamin agar slope. In Figure 8 there appears a crooked chain of four or five swollen rods highly magnified. The rods are covered with coccoid buds of various sizes, and there is a single detached coccus in the photograph. An adjoining field, not so highly magnified, is shown in Figure 9, which illustrates the various stages from minute buds on the walls of the rod to well formed detached diplococci. Figure 10 illustrates the morphology of the organisms on the blood agar. Coccoid bodies as well as rods are swollen and dotted with deeply stained granules of varying sizes. August 11—Rabbit 592 was inoculated intracerebrally with the rod form in the meat medium culture planted with the brain of rabbit 573. It died within five hours, and cultivation of the brain gave the same results as

had been obtained previously with this strain, namely, growth of the rod in meat medium, but growth of the streptococcus on agar.

If Figures 8 and 9 are compared with Figure 6, it may be noted that rods covered with budding coccoid bodies appear in the transition on agar slope from rod to streptococcus (figs. 8 and 9) the same as in the changes of morphology which occur in monkey's brain inoculated with streptococci (fig. 6).

Although the strain of the rod form from the heart blood of case J. P. M. always lost virulence in its transition to the streptococcus, the transition from rod to streptococcus occurred without loss of virulence in the strain obtained from the medulla of this case. The observations were as follows:

July 24, 1926—Meat medium was planted with a small piece of medulla. July 26—The culture was turbid. A transfer was made to vitamin agar slope. July 27—Heavy, white opaque growth covered the agar slope planted July 26 and a stained smear showed the typical Gram-positive rods with spores, granules, and budding coccoid bodies. July 28—Rabbit 561 was inoculated intracerebrally with the meat-medium culture of the rod form derived from the medulla. It died 5½ hours later, and was placed in the ice box. July 29—The brain was removed, and pieces were planted in meat medium. July 30—The meat medium was clouded with gas production, and smears showed not only the Gram-positive rods but also Gram-negative rods. The latter, which were obviously an extraneous organism, predominated on the agar slopes. In order to obtain a pure culture of the spore-bearing rods a series of five vitamin agar slopes was streaked with a loopful of the mixed meat-medium culture. July 31—The extraneous organism predominated on all five of the agar slopes, but on the fourth slope of the series there was a well-isolated colony of the spore-bearing rods. Tubes of meat medium were inoculated from this colony. August 2—Rabbit 565 was inoculated intracerebrally with the purified rod culture planted July 31. It died seven hours later, and was placed in the ice box. August 3—Meat medium and a series of vitamin agar slopes were planted with pieces of brain. August 4—All cultures planted on August 3 showed in stained smears, pure growth of the spore-bearing rods. August 26—Rabbit 616 was inoculated intracerebrally with the rod culture in meat medium planted on August 3 with the brain of rabbit 565. It died 12 hours after inoculation, and a pure culture of the spore-bearing rods was obtained in all tubes of medium planted. August 27—The remainder of the culture used for inoculating the rabbit on August 26 was passed through a Berkefeld N filter. A tube of meat medium and a vitamin agar slope were planted with the filtrate, and rabbits 618 and 619 were inoculated with the filtrate to show whether or not it contained a soluble toxin to account for the rapidly fatal results obtained following intracerebral inoculation of culture. Neither rabbit developed symptoms. August 28—There were a considerable number of small colonies on the agar slope planted with filtrate. Gram-positive diplococci, some in long chains, were found in a smear. A meat medium culture was planted from the colonies. August 29—The meat-medium culture planted August 28 was turbid with Gram-positive diplococci, some of which were in chains. Rabbit 626 was inoculated with this culture. It died 18 hours later, and the streptococcus cultivated from the brain was inoculated into rabbit 635, which died 21 hours after inoculation.

Thus a virulent streptococcus was recovered from the filtrate of a culture of the spore-bearing rods. After the agar slope planted on

August 27 with filtrate of the rod culture had been incubated for three days, smears prepared from the minute streptococcus colonies were stained with carbol fuchsin and according to Giemsa's method. The organisms found were chiefly diplococci, many in long chains with great variation in the size of the cocci and in the density of staining. Many of the cocci were swollen and distorted, taking the stain faintly. There were a few rods to be found, and a very few long threads. In some of the chains both rods and cocci could be found. They are illustrated in Figure 11.

The appearance of diplococci in the brain of a rabbit inoculated with the rod form is illustrated in Figure 12. This photograph is from a smear of the brain of rabbit 142, which was inoculated intracerebrally with rod strain P105, obtained from the filtrate of an emulsion of pieces of the mesencephalon and medulla from case E. H. Rabbit 142 was the sixth through which this strain was passed. Previous to the inoculation the culture was streaked on a series of six vitamin agar slopes, all of which developed a spreading, wrinkled growth, with no other type of colonies. Rabbit 142 died 14 hours after inoculation, and a pure culture with all of the characteristics of the spore-bearing rods grew in meat medium and on vitamin agar slopes planted with the brain. Nevertheless, the morphology of the organism in the brain itself was not that of the spore-bearing rods, but of small pleomorphic organisms and diplococci. (See fig. 12.) Only one cluster of organisms was found, a part of which appears in the photograph. No bacteria were found on other parts of the slide, although a careful search was made. It is to be noted that the morphology of the bacteria in the brain of the rabbit inoculated with the rod culture was identical with that of the bacteria in the mid-brain from a human case of epidemic encephalitis, as shown in Figure 1. Bacteria of the same morphology as illustrated in Figure 12 were also found in the brains of rabbits inoculated with herpes virus. (See figs. 1 and 2 of the preceding paper (1927).) Moreover, the arrangement of bacteria was the same in the human brain, in the rabbit brains inoculated with virus, and in the rabbit brain inoculated with rod culture. In every case the bacteria were in compact masses difficult to find.

OCCURRENCE OF UNSTABLE, NONCULTIVABLE FORMS OF THE ORGANISM

Sometimes bacteria were seen in smears of spinal fluid taken during the acute stage of the disease. (See figs. 2, 3, and 4.) Cultures from these samples were obtained with great difficulty, however. The following experience in cultivating bacteria from the spinal fluid taken from case V. D. is typical. Although bacteria were seen in smears of all of three specimens of spinal fluid taken during the severe initial attack of the disease, a single culture was obtained from only one of the specimens. To secure this culture two tubes of meat

medium were each planted with 0.6 or 0.7 c c of spinal fluid. On the following day the broth in one of the tubes appeared to be turbid, but nothing definite could be made out in smears. Two days later smears of the culture were prepared again, and when stained with carbol fuchsin great numbers of single coccoid bodies could be found, some of which were exceedingly minute. Subcultures were made before and after filtration through a Berkefeld N filter. The meat medium planted with culture before filtration gave feeble growth of a mixture of diplococci and rods. In meat medium planted with the filtrate, however, a culture of the rods was obtained which grew readily in subculture.

It often happens that meat medium planted with blood or spinal fluid from an acute case of epidemic encephalitis becomes turbid, but very few or no bacteria can be found in stained smears. If the culture is examined in hanging drop, however, coccoid bodies of varying sizes, usually single, may be readily seen. It commonly happens that no growth can be obtained in heavily planted subcultures, and the turbidity of the original culture clears up. Sometimes after clearing up there is a sudden profuse development of the rod or diplococcus form as late as the eighth or ninth day or even later. The clearing of turbid cultures resembles bacteriophagic behavior. Many unsuccessful attempts were made, however, to transfer the suspected bacteriophagic action to cultures of the rod or streptococcus form.

EXPLANATION OF FIGURES

Figure 1. Smear of mesencephalon from human case (C. D.) stained by Giemsa's method. × 1,200 (approx.).

Figures 2, 3, and 4. Organisms in spinal fluid from case V. D. stained with carbol-fuchsin. Figure 2, × 1,200 (approx.); Figures 3 and 4, × 1,800 (approx.).

Figure 5. The spore-bearing rods stained with Gram-safranin. × 1,200 (approx.)

Figure 6. Transitional stage in a smear of the brain of monkey 39, inoculated with the streptococcus form. Stained with Gram-safranin. × 2,000 (approx.).

Figure 7. Transitional stage in a smear from a vitamin agar culture, the second culture generation from human heart blood. Stained with Gram-safranin. × 2,000 (approx.).

Figures, 8, 9, and 10. Transitional stages in smears from agar cultures of a strain recently cultivated from human heart blood. Stained with Gram-safranin. Figures 8 and 9, from vitamin agar. Figure 10, from blood agar. Figure 8, × 2,300 (approx.); Figure 9, × 1,460 (approx.).

Figure 11. Rods in the chains of streptococci from a vitamin agar culture planted with filtrate of a culture of the rod form. Stained by Giemsa's method. × 1,700 (approx.).

Figure 12. Diplococci and pleomorphic forms in the brain of a rabbit inoculated with the spore-bearing rods. Stained with Gram-safranin. × 1,700 (approx.).

Figure 13. Streptococci in the chains with rods containing spores. Stained with Gram-safranin. × 1,200 (approx.).

Figure 14. Rods in freely growing cultures of streptococci. Stained with Gram-safranin.

Figure 15. Rods encasing short double chains of minute coccoid bodies. Stained with Gram-safranin. × 3,000 (approx.).

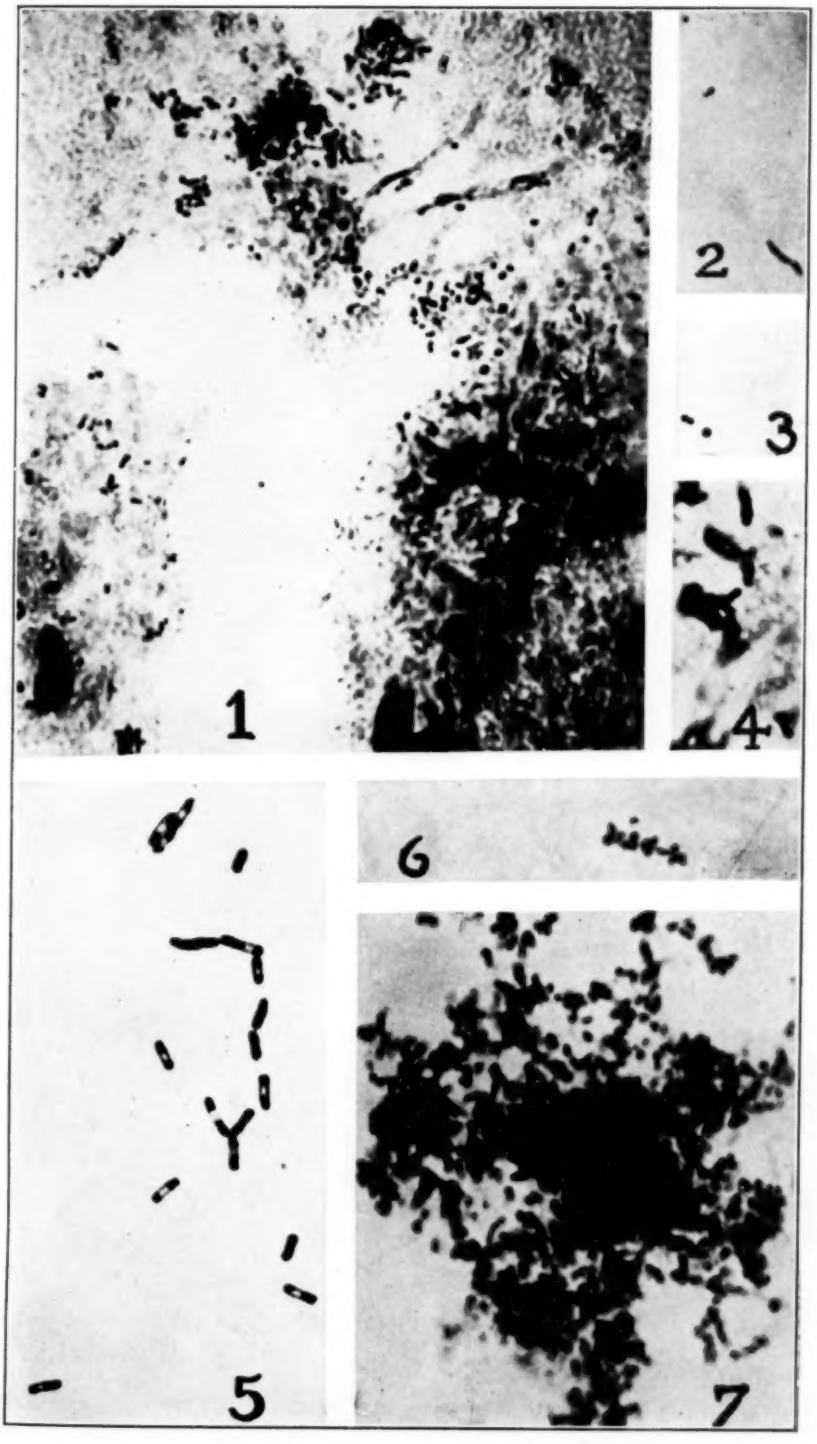
Figure 16. Rods encasing short double chains of minute coccoid bodies, and gonidia developing on the walls. Stained with Gram-safranin. × 1,800 (approx.).

Figure 17. Gonidia on the walls of rods. Stained with Gram-safranin. × 1,000 (approx.).

Figure 18. Minute gonidia, some stained, some unstained, on the walls of rods, or detached. Stained with Gram-safranin.

Figure 19. Coccoid bodies, varying in size from minute to giant, on the walls of rods. Stained with carbol-fuchsin. × 900 (approx.).

Figure 20. Gonidia on the walls of rods containing spores. Stained with Gram-safranin. × 1,800 (approx.).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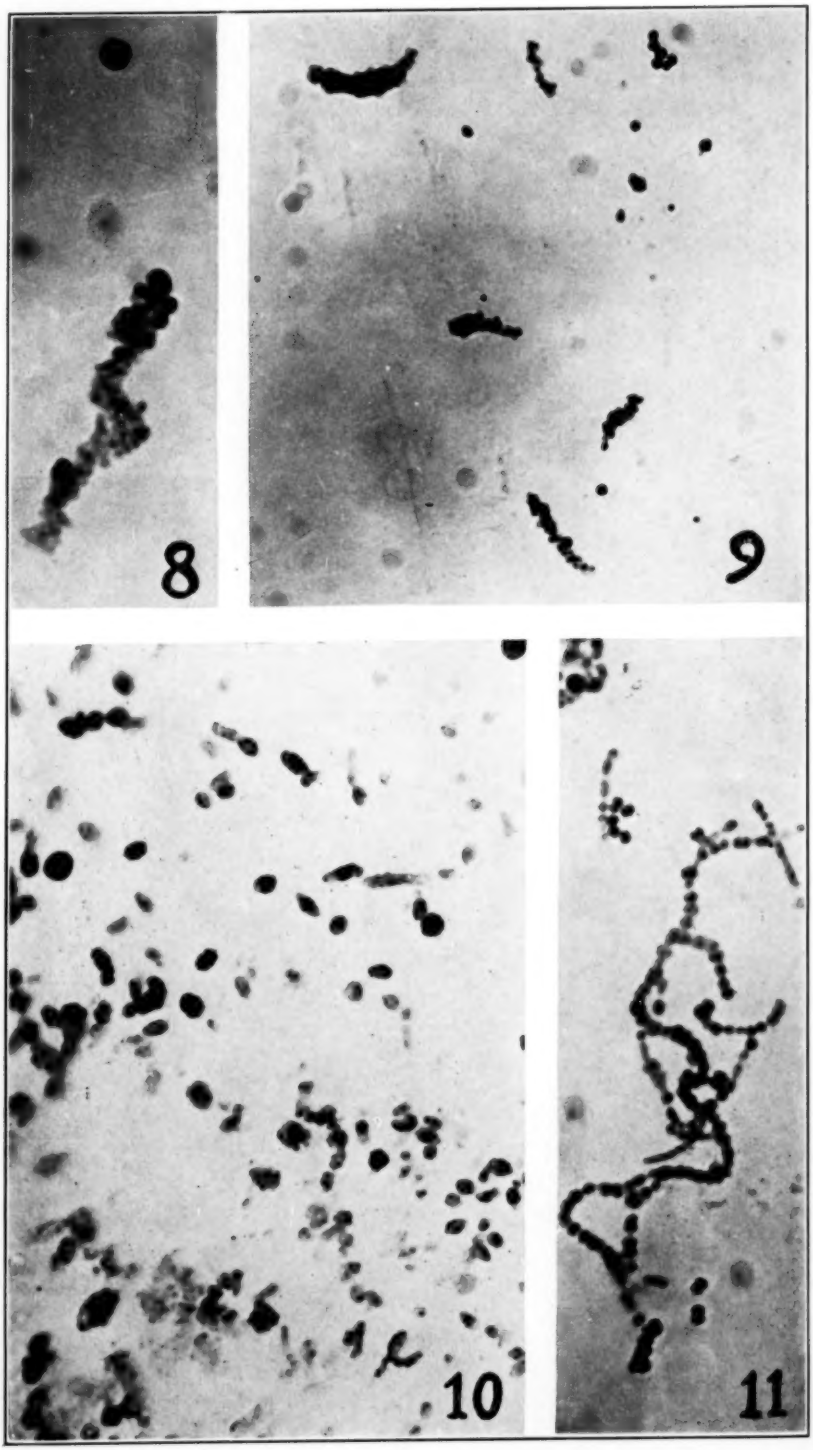
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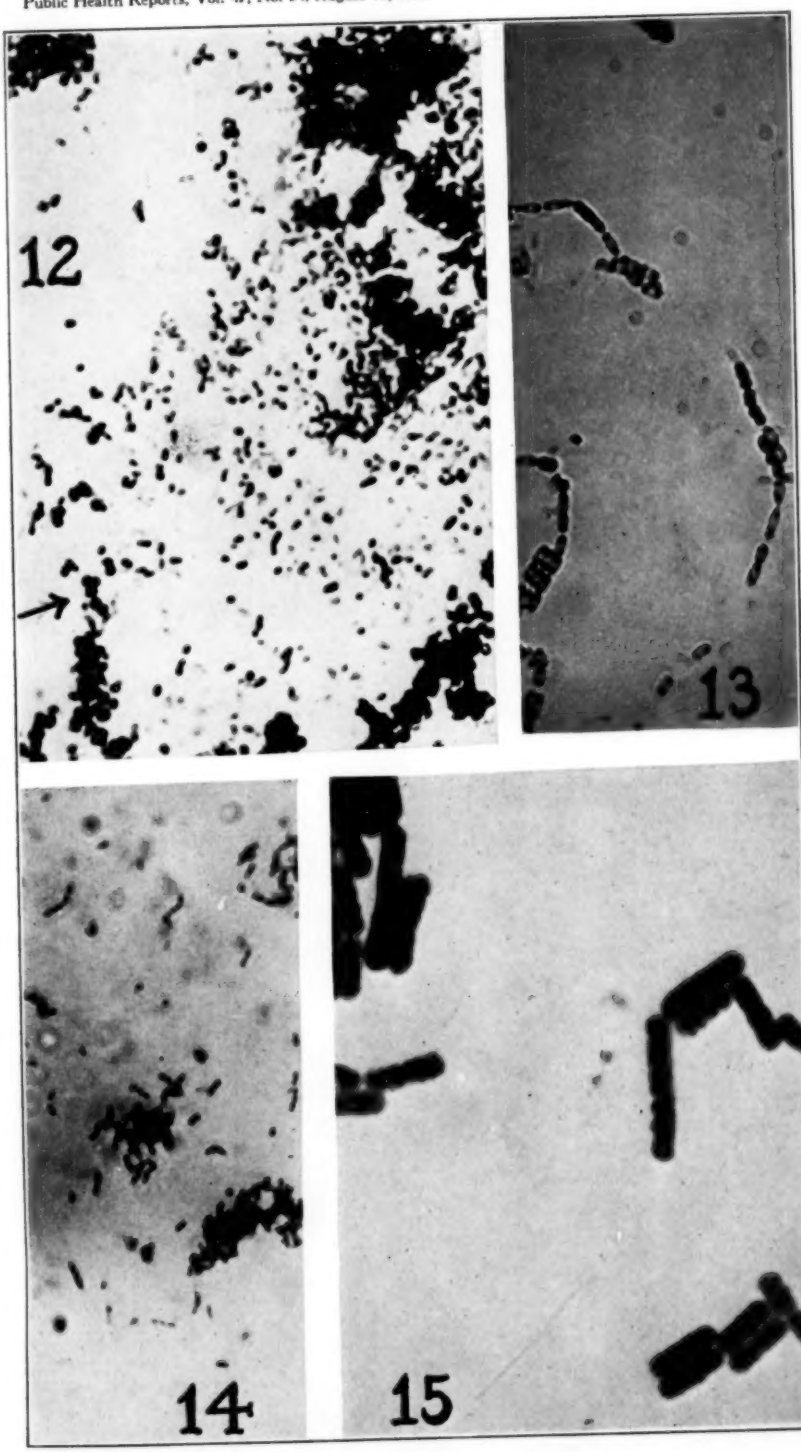
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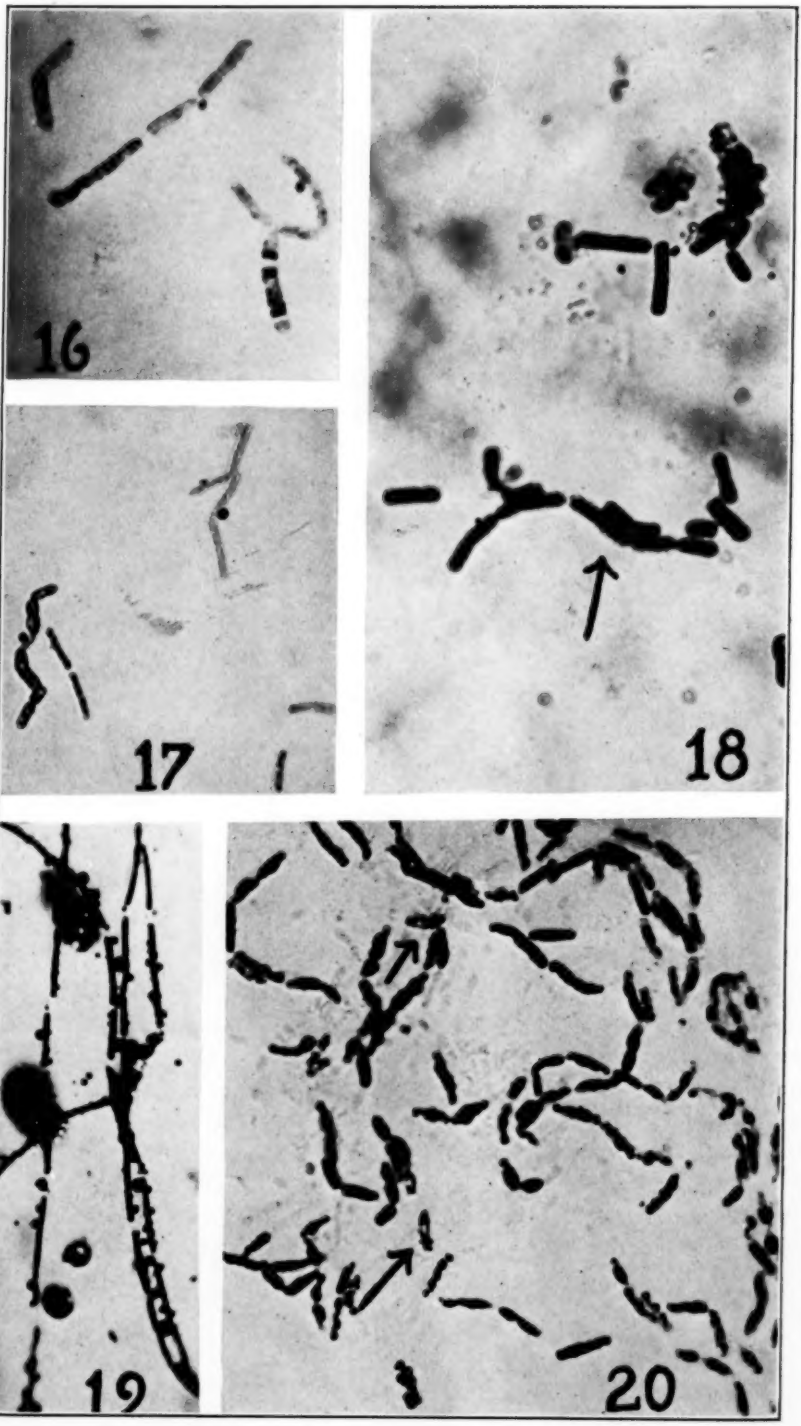
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In culturing the brains of rabbits which have died following intracerebral inoculation of the rod form, it is readily recovered if death occurs within a few days. If, however, death is delayed until a week or more after inoculation, the same difficulty in recovering the inoculated organism may be experienced as is described above for its cultivation from human blood and spinal fluid. Residence of the bacterial form in the animal body brings about metamorphosis into a difficultly cultivable phase.

OCCURRENCE OF THE COMPLEMENTARY FORMS IN FREELY GROWING CULTURES

Although it appears to require a sojourn of at least several days in living animal tissue, or some adverse condition of laboratory cultivation to produce one of the described forms of the organism from the other, an occasional cell which has assumed the complementary form may frequently be observed in smears from freely growing cultures of either form. These occasional cells of the complementary form seem to be unable to establish progeny of their own kind until some circumstance checks the multiplication of the other type of cells.

In Figure 13 there are illustrated streptococci and spore-bearing rods in the same chains. The photograph is of a smear of a 24-hour culture of the rod form on vitamin agar slope, the second culture generation after animal passage. Growth was abundant and spreading, typical of the rod form.

The development of coccoid bodies on the walls of spore-bearing rods is not a rare occurrence in cultures which have been maintained on culture medium for a long time. Indeed, they were observed in a culture of *B. subtilis* (strain No. 243), obtained from the American type culture collection through the courtesy of the curator, Dr. George H. Weaver, 637 South Wood Street, Chicago, Ill. The coccoid bodies were noted to be quite common in an agar slope culture of this strain which had been growing for eight days at room temperature. Some of the coccoid bodies seen in the smear from this culture were exceedingly minute.

Occasional rods may be induced readily in cultures of the streptococcus form by incubating a plain broth culture for several days, then transplanting it to agar slope. The rods will appear in smears prepared from the agar slope. They disappear, however, in subcultures. Well-formed rods, which were induced in streptococcus P123 in the manner just described (the culture in plain broth had been incubated for two weeks), are illustrated in Figure 14.

THE PROCESS OF TRANSFORMATION

The transformation from streptococcus to rod appears to take place simply by the elongation of cells. (See figs. 11 and 14.)

There appear to be at least two ways by which cocci may be derived from rods. The rods may swell and at the same time develop granules which stain deeply. The rods then disintegrate, freeing the granules, which enlarge and multiply as cocci. This process is illustrated in Figures 7, 8, 9, and 10. Occasionally rods may be found in which the granules are so arranged that they appear like a pair of short chains of minute diplococci encased by the rod, as in Figures 15 and 16.

Cocci also may be derived from rods without disintegration by the development of coccoid bodies on the walls. The coccoid bodies are called gonidia by Lohnis and Smith, and by other investigators. (See figs. 8, 9, 16, 17, 18, 19, and 20.) The gonidia may become detached when very minute and increase to the size of an ordinary coccus independent of the rod. Several minute detached gonidia may be seen in Figures 18 and 19. Sometimes the deeply stained gonidia may be found on the walls of rods which have also developed the unstainable, heat-resistant spores. (See fig. 20.) Figures 6, 8, and 9 show that the gonidia may develop in great profusion on the walls of the rods, sometimes almost concealing them.

THE FILTERABLE PHASE

Lohnis and Smith observed the formation of gonidia by *B. subtilis*. They noted that some of the gonidia did not take the stain, and there were always some just at the limit of visibility. They were able to obtain growths of bacteria from the filtrates of cultures containing gonidia.

In a paper by Churchman on the structure of *Bacillus anthracis*, there are illustrations of coccoid Gram-positive bodies on the walls of Gram-negative rods. The general appearance of *B. anthracis* in Churchman's illustrations resembles very closely the appearance of the spore-bearing rod with gonidia on the walls of the rods as illustrated in Figure 20. Churchman believes that the rods of *B. anthracis* consist of a Gram-negative medulla surrounded by a Gram-positive cortex which is readily soluble, and that a partial dissolution of the cortex results in a mottled appearance of the cells. He demonstrated a proteinlike substance in the filtrate of cultures in which the cortex had been dissolved.

Certain observations enumerated below suggest that the smallest of the gonidia may constitute the filterable phase of the organism described in this paper:

(1) Coccoid bodies of all sizes may be found in stained smears from certain cultures. The sizes may vary from that of a giant coccus to minute bodies so small that they are barely visible. Inasmuch as every gradation between these two extremes exists (see fig. 19), there is no reason to assume that the limit of visibility is the lowest limit of size of the gonidia. There may be gonidia smaller than the smallest that can be seen in the stained smears.

(2) There is no more satisfactory method for obtaining a pure culture of diplococcus from the rod than to plant the filtrate of one of the early generation meat medium cultures of the rod form showing an abundance of budding gonidia.

(3) The location of minute unstained gonidia along the walls of rods may be seen in Figure 18, particularly on the rod pointed out by the arrow. In this smear some of the gonidia were stained, others failed to take the stain.

(4) Subcultures are just as readily obtained by planting the filtrates as by planting the unfiltered, turbid suspensions of cultures derived from blood or spinal fluid when those cultures contain only the unstainable coccoid bodies visible in hanging drop.

(5) After the rods have remained in the brains of experimental animals for a couple of weeks or more, they may be readily recovered by planting an emulsion of the brain in meat medium; and cultures of streptococci may be recovered sometimes from the Berkefeld N filtrates of the emulsion by planting the filtrate in meat medium.

DISCUSSION

The observations described in this paper are discordant with the monomorphic theory, now discarded by most bacteriologists, but they are in agreement with the laws of general biology. As pointed out by the writer in an earlier paper (1929), from the point of view of general biology, complex life cycles with metamorphoses accompanied by changes in habitat and biologic behavior should be expected in bacteria, rather than monomorphism.

Life cycles are a law of nature; and with the descent in the scale of life, the cycles become more and more complex, and metamorphoses, with the concomitant changes in habitat and in biologic behavior, become more and more pronounced. Algæ, fungi, and protozoa—the plant and animal groups standing next higher than the bacteria—exhibit marvelous life cycles. It is unreasonable to think that a law of nature which becomes more and more complex with the descent in the scale of life would be suspended in its lowest known form.

SUMMARY

A streptococcus, a filterable form, and an aerobic spore-bearing rod are phases in the life cycle of an organism cultivated from cases of epidemic encephalitis and from the so-called herpetic and encephalitic viruses.

The details of the transition from one form to the other are described in a few instances which exemplify metamorphoses that have been observed many times.

ACKNOWLEDGMENTS

I am indebted to Dr. Walter Freeman, of St. Elizabeths Hospital, Washington, D. C., for the human encephalitic material used in this study, and also for making the photographs.

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DEATHS DURING WEEK ENDED JULY 30, 1932

Summary of information received by telegraph from industrial insurance companies for the week ended July 30, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 30, 1932	Corresponding week 1931
Policies in force	71, 641, 157	75, 015, 314
Number of death claims	13, 014	12, 678
Death claims per 1,000 policies in force, annual rate	9. 5	8. 8
Death claims per 1,000 policies, first 30 weeks of year, annual rate	10. 0	10. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended July 30, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates furnished in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended July 30, 1932				Corresponding week, 1931		Death rate [1] for the first 30 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant-mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Total (85 cities)	6, 632	9. 5	521	[4] 44	10. 7	622	11. 7	12. 6
Akron	31	6. 1	3	37	7. 7	8	7. 6	8. 0
Albany [5]	29	11. 6	2	41	14. 9	4	14. 1	14. 5
Atlanta [6]	57	10. 5	4	39	11. 6	6	13. 6	15. 7
White	32	8. 9	3	44	8. 8	3	10. 7	12. 3
Colored	25	13. 7	1	29	17. 3	3	19. 2	22. 3
Baltimore [5] [6]	148	9. 4	11	39	14. 1	21	13. 6	15. 2
White	111	8. 7	8	36	13. 4	16	12. 6	13. 9
Colored	37	12. 9	3	48	17. 4	5	18. 1	21. 0
Birmingham [5]	60	11. 3	4	42	11. 6	6	11. 5	14. 3
White	25	7. 6	2	33	8. 4	6	8. 9	11. 0
Colored	35	17. 4	2	54	16. 8	0	15. 8	19. 5
Boston	146	9. 7	8	24	12. 7	19	14. 6	14. 7
Bridgeport	24	8. 5	2	36	9. 9	4	11. 0	11. 7
Buffalo	105	9. 3	12	58	11. 6	17	12. 9	13. 8
Cambridge	21	9. 6	1	21	10. 1	0	13. 0	12. 6
Camden	30	13. 2	5	88	13. 1	4	14. 9	14. 7
Canton	16	7. 7	1	25	11. 7	3	9. 7	10. 7
Chicago [5]	556	8. 3	37	37	10. 1	55	10. 2	11. 4
Cincinnati	133	15. 0	11	71	14. 7	16	15. 5	16. 7
Cleveland	187	10. 6	8	26	9. 3	20	11. 3	11. 7
Columbus	76	13. 3	9	90	12. 3	3	14. 0	14. 4
Dallas [6]	62	11. 5	7	-------	9. 4	6	10. 9	11. 9
White	40	8. 9	7	-------	7. 9	3	10. 0	10. 5
Colored	22	23. 6	0	-------	16. 5	3	15. 4	18. 4
Dayton	46	11. 6	5	72	10. 7	4	12. 2	12. 7
Denver	56	9. 9	6	59	11. 6	3	14. 6	14. 5
Des Moines	29	10. 4	3	51	12. 6	2	11. 6	11. 8
Detroit	192	5. 8	18	32	7. 2	19	8. 0	8. 8
Duluth	16	8. 2	2	58	12. 3	2	10. 8	11. 0
El Paso	19	9. 3	3	-------	15. 4	4	13. 9	16. 5
Erie	17	7. 5	3	64	8. 9	3	11. 7	10. 8
Evansville	13	6. 4	0	0	12. 5	3	10. 3	11. 9
Fall River [5] [7]	17	7. 7	1	27	9. 5	1	12. 2	12. 0
Flint	16	4. 9	3	44	4. 1	0	7. 8	7. 5
Fort Wayne	16	6. 9	3	77	11. 4	0	10. 4	11. 2
Fort Worth [6]	32	9. 8	4	-------	10. 3	0	10. 4	11. 3
White	24	8. 7	2	-------	10. 4	0	9. 8	10. 9
Colored	8	15. 7	2	-------	9. 6	0	13. 4	13. 6
Grand Rapids	22	6. 6	1	17	6. 7	4	9. 0	9. 5
Hartford	49	15. 1	5	66	-------	-------	-------	-------

See footnotes at end of table.

Deaths from all causes incerta in large cities of the United States during the week ended July 30, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 30, 1932				Corresponding week, 1931		Death rate for the first 30 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant-mortality rate	Death rate	Deaths under 1 year	1932	1931
Houston [6]	60	9.7	3	-------	9.8	7	11.1	11.5
White	35	7.7	2	-------	8.0	6	10.2	10.6
Colored	25	15.2	1	-------	14.4	1	13.5	13.8
Indianapolis [6]	89	12.4	7	57	12.0	4	12.9	14.3
White	76	12.1	6	55	12.7	4	12.5	13.9
Colored	13	14.7	1	69	6.9	0	15.8	17.3
Jersey City	58	9.5	7	58	10.6	9	11.5	12.3
Kansas City, Kans. [6]	32	13.5	6	133	13.6	3	12.5	13.6
White	27	14.1	4	107	13.6	3	12.1	12.6
Colored	5	11.0	2	256	13.3	0	14.0	17.8
Kansas City, Mo.	81	10.2	4	45	12.0	11	12.4	14.0
Knoxville [6]	15	7.0	0	0	10.0	2	12.0	13.1
White	12	6.7	0	0	9.1	2	11.1	12.0
Colored	3	8.6	0	0	14.6	0	17.0	18.7
Long Beach	24	7.8	3	79	9.6	1	9.1	10.0
Los Angles	245	9.3	19	56	9.7	17	10.7	11.0
Louisville [6]	65	11.0	9	82	9.5	9	13.6	15.0
White	54	10.8	8	83	8.0	5	12.4	13.4
Colored	11	12.0	1	75	17.5	4	20.4	23.5
Lowell [7]	20	10.4	1	26	10.4	5	14.0	13.1
Lynn	12	6.1	0	0	8.1	1	10.9	10.4
Memphis [6]	106	21.0	5	54	13.7	7	17.0	16.8
White	53	17.0	2	34	12.7	3	13.3	13.9
Colored	53	27.5	3	90	15.3	4	22.8	21.5
Miami [6]	20	9.6	1	28	9.7	2	12.1	12.3
White	13	8.0	1	39	9.6	2	10.9	11.1
Colored	7	15.1	0	0	10.3	0	16.1	16.1
Milwaukee	83	7.2	3	14	5.5	7	9.0	9.9
Minneapolis	66	9.3	6	39	11.0	5	10.7	12.0
Nashville [6]	48	16.0	10	149	17.4	7	15.6	17.4
White	24	11.0	8	157	15.7	5	14.0	14.9
Colored	24	29.3	2	125	21.9	2	19.7	23.8
New Bedford [7]	34	15.8	3	86	13.0	3	11.9	13.1
New Haven	32	10.3	2	40	16.7	4	12.4	12.7
New Orleans [6]	135	14.9	14	80	13.6	11	16.0	17.4
White	83	12.9	5	44	10.5	8	13.6	14.1
Colored	52	19.8	9	147	21.3	3	21.9	25.6
New York	1,175	8.5	80	36	10.2	107	11.0	11.9
Bronx Borough	168	6.4	11	32	7.4	6	8.1	8.7
Brooklyn Borough	395	7.7	38	43	9.0	35	10.2	10.9
Manhattan Borough	438	12.9	26	37	15.4	49	16.8	18.0
Queens Borough	129	8.6	4	17	7.2	13	7.1	7.7
Richmond Borough	45	14.0	1	20	15.0	4	14.2	14.2
Newark, N. J	71	8.3	4	22	10.6	6	10.9	12.3
Oakland	51	8.9	1	13	7.3	1	10.5	10.6
Oklahoma City	48	12.2	6	82	9.8	5	10.4	11.6
Omaha	47	11.2	3	34	13.2	2	13.1	14.2
Paterson	28	10.5	5	91	12.0	3	13.1	14.2
Peoria	17	8.0	3	83	9.1	1	11.2	13.2
Philadelphia	325	8.6	23	36	10.3	28	12.9	14.0
Pittsburgh	102	7.8	12	55	13.9	20	13.0	15.5
Portland, Oreg.	39	9.9	3	38	10.9	4	11.2	12.0
Providence	49	10.0	2	19	13.3	6	13.6	13.5
Richmond [6]	56	15.8	5	75	15.3	6	14.2	16.4
White	35	13.8	3	67	11.5	3	11.7	14.0
Colored	21	20.8	2	92	24.6	3	20.4	22.4
Rochester	57	8.9	4	38	8.2	6	12.4	12.4
St. Louis	224	14.1	15	54	11.3	10	13.9	16.3
St. Paul	42	7.9	3	32	8.7	2	10.3	11.3
Salt Lake City [6]	27	9.7	5	79	16.0	2	11.0	12.4
San Antonio	67	14.2	5	-------	11.9	7	14.1	13.4
San Diego	43	13.6	3	65	12.3	3	14.2	14.1
San Francisco	188	10.9	5	33	12.4	13	12.5	13.2
Schenectady	25	13.5	3	87	9.8	0	10.6	10.8
Seattle	58	8.1	3	30	9.3	0	11.7	11.7
Somerville	20	9.8	4	161	4.5	0	9.5	9.6
South Bend	9	4.2	1	29	2.9	0	7.7	8.5

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 30, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 30, 1932				Corresponding week, 1931		Death rate for the first 30 weeks	
	Total deaths	Death rate	Deaths under year	Infant-mortality rate	Death rate	Deaths under 1 year	1932	1931
Spokane	15	6.7	2	53	13.9	0	12.1	12.6
Springfield, Mass	29	9.8	3	51	11.6	2	11.6	12.4
Syracuse	40	9.7	2	26	11.5	4	11.9	12.1
Tacoma	28	13.5	0	0	11.1	1	12.4	12.5
Tampa [6]	21	10.2	1	29	11.9	1	11.8	12.6
White	16	9.8	1	33	10.7	0	11.1	11.6
Colored	5	11.5	0	0	16.4	1	14.3	16.1
Toledo	63	10.9	5	54	9.8	4	12.1	12.4
Trenton	25	10.5	3	59	14.3	4	16.1	17.2
Utica	22	11.2	1	28	17.3	1	15.7	14.7
Washington, D. C. [4]	126	13.3	16	90	15.9	14	16.8	16.8
White	93	13.6	11	90	12.6	4	15.0	14.1
Colored	33	12.6	5	89	24.7	10	21.6	22.8
Waterbury	8	4.1	0	0	6.7	0	9.4	9.9
Wilmington, Del. [7]	26	12.8	4	90	9.3	3	15.6	14.6
Worcester	33	8.7	2	28	11.1	2	12.6	12.9
Yonkers	20	7.4	4	103	7.9	1	7.9	9.0
Youngstown	21	6.3	0	0	8.1	1	9.8	10.9

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 estimated live births. Cities left blank are not in the registration area for births.

[4] Data for 81 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 6, 1932, and August 8, 1931

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 6, 1932, and August 8, 1931

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931
New England States:								
Maine	2	1			4	3	0	0
New Hampshire					2	1	0	0
Vermont					19	4	0	0
Massachusetts	37	31		1	88	53	0	1
Rhode Island	1	5			3	35	0	0
Connecticut	4	2		2	26	34	1	2
Middle Atlantic States:								
New York	49	58	[1] 3	[1] 1	311	378	2	12
New Jersey	13	12	3	2	94	48	2	3
Pennsylvania	34	38			194	154	7	7
East North Central States:								
Ohio	24	14	4	1	67	37	0	4
Indiana	23	8	7		12	16	5	3
Illinois	31	48	4		24	76	2	4
Michigan	7	11			214	21	1	8
Wisconsin	38	4	8	7	45	86	3	2
West North Central States:								
Minnesota	2	3		2	5	5	1	3
Iowa	11	3			4	1	1	0
Missouri	4	12	1		6	1	1	1
North Dakota	4	3			16	5	0	0
South Dakota	3	3				1	0	0
Nebraska	2	1			4	1	3	1
Kansas	6	6		1	17	10	0	0
South Atlantic States:								
Delaware		1				1	1	0
Maryland [2] [3]	6	10	4		7	21	1	0
District of Columbia	1	5				4	0	0
Virginia [3]	36				22		1	
West Virginia	8	6		12	34	46	0	0
North Carolina [3]	21	27	28	1	26	38	1	1
South Carolina [3]	7	18	49	70	16	6	0	1
Georgia [3]	18	5	11	6	3	3	1	0
Florida	11	3	2		2	4	0	0
East South Central States:								
Kentucky						12	5	1
Tennessee	6	7	13	1		9	0	2
Alabama [3]	14	13	6			22	1	9
Mississippi	19	11					0	0
West South Central States:								
Arkansas	2	8			1	2	0	0
Louisiana	15	13		9	3		0	0
Oklahoma [4]	30	11	3	12	3		0	0
Texas [3]	46	27	16	7	13	1	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, week ended Aug. 6, 1932, 41 cases; 5 cases in Maryland, 1 case in North Carolina, 11 cases in Texas, 10 cases in Alabama, 10 cases in Georgia, 2 cases in South Carolina, and 2 cases in Virginia.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 6, 1932, and August 8, 1931—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931
Mountain States:								
Montana	1				32	8	1	0
Idaho	2						0	1
Wyoming					3	5	0	0
Colorado	7	6			7	3	0	0
New Mexico	8	5			2		0	0
Arizona	2	2			1	1	0	0
Utah [1]			1		2	5	0	0
Pacific States:								
Washington	3	3	2		14	6	1	2
Oregon	3	2	11	1	13	11	0	0
California	40	30	119	14	35	60	1	9
Total	600	476	295	150	1,394	1,238	44	72

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931
New England States:								
Maine	1	7	3	8	0	1	2	3
New Hampshire	1	0	3	2	0	0	1	1
Vermont	0	0	4	2	0	4	0	0
Massachusetts	2	67	60	67	0	0	8	8
Rhode Island	2	16	6	5	0	0	1	3
Connecticut	0	97	9	7	0	0	2	2
Middle Atlantic States:								
New York	12	676	157	118	2	2	54	34
New Jersey	7	55	44	26	0	0	9	7
Pennsylvania	17	1	99	85	0	0	34	49
East North Central States:								
Ohio	2	5	64	38	4	5	44	25
Indiana	0	1	32	21	1	17	20	13
Illinois	10	15	48	63	1	3	44	31
Michigan	7	17	78	70	0	5	17	10
Wisconsin	1	10	8	18	1	1	6	4
West North Central States:								
Minnesota	6	13	13	12	1	4	3	2
Iowa	2	3	6	8	8	10	17	4
Missouri	1	7	28	14	1	4	28	18
North Dakota	2	1	1	3	4	3	3	1
South Dakota	0	0	4	6	0	0	0	3
Nebraska	0	0	0	4	0	2	2	3
Kansas	3	0	18	10	0	14	9	13
South Atlantic States:								
Delaware	0	1	2	2	0	0	1	2
Maryland [2] [3]	3	1	25	7	0	0	41	4
District of Columbia	0	1	2	5	0	0	0	0
Virginia [2]	2		11		0		52	
West Virginia	0	1	4	11	0	0	45	35
North Carolina [4]	0	5	15	34	0	1	45	8
South Carolina [4]	5	0	4	1	0	0	80	112
Georgia [4]	2	3	4	11	0	1	87	59
Florida	0	0	3	0	1	1	9	3
East South Central States:								
Kentucky	1	2	17	13	0	0	127	45
Tennessee	0	2	7	10	0	3	111	127
Alabama [4]	3	0	8	23	0	1	33	68
Mississippi	0	0	7	12	0	9	31	57
West South Central States:								
Arkansas	0	0	5	2	1	4	13	40
Louisiana	2	0	5	10	1	3	27	71
Oklahoma [4]	0	1	4	7	7	7	66	45
Texas [4]	2	4	17	19	1	5	43	29

[1] Week ended Friday.
[2] Typhus fever, week ended Aug. 6, 1932, 41 cases; 5 cases in Maryland, 1 case in North Carolina, 11 cases in Texas, 10 cases in Alabama, 10 cases in Georgia, 2 cases in South Carolina, and 2 cases in Virginia.
[4] Figures for 1932 are exclusive of Oklahoma City and Tulsa, and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 6, 1932, and August 8, 1931—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931	Week ended Aug. 6, 1932	Week ended Aug. 8, 1931
Mountain States:								
Montana	0	2	8	4	4	2	2	5
Idaho	0	0	1	6	5	0	2	0
Wyoming	0	0	1	1	0	0	0	0
Colorado	0	0	6	6	2	0	10	10
New Mexico	0	1	0	2	0	0	6	4
Arizona	0	1	0	0	0	1	0	2
Utah [1]	0	0	2	1	0	0	0	0
Pacific States:								
Washington	0	4	8	9	6	17	4	6
Oregon	1	0	11	1	2	14	8	8
California	4	9	35	28	8	15	9	25
Total	101	1,029	906	812	56	159	1,119	999

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1932										
Florida	----	35	10	36	40	8	0	9	5	16
Illinois	19	202	86	11	3,123	1	10	989	33	67
July, 1932										
Connecticut	2	9	15	----	319	----	3	81	0	7
District of Columbia	----	35	3	----	16	1	0	19	0	13
Florida	----	33	1	36	4	5	0	8	1	19
Iowa	1	46	----	1	17	----	4	34	23	16
Massachusetts	2	141	4	5	1,393	3	7	602	0	20
Nebraska	1	17	5	----	12	----	2	20	8	4

June, 1932

	Cases
Chicken pox:	
Florida	14
Illinois	1,167
Dysentery:	
Florida	2
Illinois (amebic)	4
Illinois (bacillary)	6
German measles:	
Illinois	33
Lead poisoning:	
Illinois	3
Lethargic encephalitis:	
Illinois	7
Mumps:	
Florida	14
Illinois	208
Ophthalmia neonatorum:	
Illinois	4
Paratyphoid fever:	
Illinois	1
Puerperal septicemia:	
Illinois	7
Septic sore throat:	
Illinois	5
Trachoma:	
Illinois	7
Typhus fever:	
Florida	8
Undulant fever:	
Illinois	6
Whooping cough:	
Florida	72
Illinois	1,219

July, 1932

	Cases
Chicken pox:	
Connecticut	176
District of Columbia	26
Florida	4
Iowa	24
Massachusetts	441
Nebraska	10

	Cases
Conjunctivitis:	
Connecticut	1
Dysentery:	
Massachusetts	1
German measles:	
Connecticut	8
Iowa	1
Massachusetts	22
Impetigo contagiosa:	
Iowa	1
Lead poisoning:	
Massachusetts	2
Lethargic encephalitis:	
District of Columbia	1
Florida	1
Massachusetts	5
Mumps:	
Connecticut	80
Florida	13
Iowa	23
Massachusetts	341
Nebraska	14
Ophthalmia neonatorum:	
Massachusetts	35
Paratyphoid fever:	
Connecticut	1
Massachusetts	2
Rabies in animals:	
Connecticut	5
Rabies in man:	
Connecticut	1
Iowa	1
Rocky Mountain spotted or tick fever:	
District of Columbia	3
Septic sore throat:	
Connecticut	4
Iowa	1
Massachusetts	20
Tetanus:	
Connecticut	1
Massachusetts	5
Trachoma:	
Massachusetts	4
Trichinosis:	
Massachusetts	1
Typhus fever:	
Florida	6
Undulant fever:	
Connecticut	2
Iowa	8
Massachusetts	1
Vincent's angina:	
Iowa	1
Whooping cough:	
Connecticut	433
District of Columbia	30
Florida	31
Iowa	44
Massachusetts	582
Nebraska	78

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,980,000. The estimated population of the 90 cities reporting deaths is more than 32,420,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 30, 1932, and August 1, 1931

	1932	1931	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	482	483	----------
97 cities	163	227	388
Measles:			
45 States	1,958	1,898	----------
97 cities	546	597	----------
Meningococcus meningitis:			
46 States	37	60	----------
97 cities	19	32	----------
Poliomyelitis:			
46 States	81	508	----------
Scarlet fever:			
46 States	1,001	875	----------
97 cities	336	299	296
Smallpox:			
46 States	94	186	----------
97 cities	11	15	20
Typhoid fever:			
46 States	1,124	908	----------
97 cities	131	172	109
Deaths reported			
Influenza and pneumonia:			
90 cities	306	313	----------
Smallpox:			
90 cities	0	0	----------

City reports for week ended July 30, 1932

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1923 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	1
Burlington	0	0	0		0	0	1	0
Massachusetts:								
Boston	31	15	20		0	28	23	11
Fall River	0	1	0		0	1	2	1
Springfield	6	1	0		0	3	0	0
Worcester	0	1	1		0	4	0	1
Rhode Island:								
Pawtucket	0	0	0		0	0	0	0
Providence	3	3	0		0	3	0	2
Connecticut:								
Bridgeport	5	2	0		0	8	0	0
Hartford	0	1	0		0	1	1	0
New Haven	0	1	0		0	0	2	0
MIDDLE ATLANTIC								
New York:								
Buffalo	5	6	0		0	1	0	10
New York	64	112	35	4	2	153	83	66
Rochester	3	1	0		0	0	0	2
Syracuse	4	1	0		0	16	1	1
New Jersey:								
Camden	0	2	2		0	0	0	3
Newark	3	8	0	1	0	30	19	2
Trenton	0	0	1		0	1	0	4
Pennsylvania:								
Philadelphia	24	28	3	1	0	4	11	10
Pittsburgh	8	10	2		0	4	6	7
Reading	1	1	0		0	4	1	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	3	0		1	0	0	7
Cleveland	23	14	0	1	0	9	6	7
Columbus	3	2	3		0	12	1	1
Toledo	5	2	3		0	7	0	2
Indiana:								
Fort Wayne	1	1	5		0	0	0	1
Indianapolis	1	2	0		0	0	13	4
South Bend	0	0	0		0	0	0	0
Terre Haute	0	0	8		0	0	0	5
Illinois:								
Chicago	24	52	5		0	34	3	25
Springfield	0	0	0	1	0	0	0	1

City reports for week ended July 30, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	8	21	6		0	138	6	13
Flint	0	1	0		0	0	3	0
Grand Rapids	4	1	0		0	0	4	1
Wisconsin:								
Kenosha	0	0	0		0	7	1	1
Madison	2	0	[1]2			3	0	
Milwaukee	15	7	0		0	20	1	3
Racine	4	0	0		0	0	2	0
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	1	0		0	1	1	1
Minneapolis	1	7	0		0	3	0	6
St. Paul	4	2	0		0	3	4	5
Iowa:								
Des Moines	0	1	2			0	0	
Sioux City	1	0	2			0	1	
Waterloo	0	0	0			0	2	
Missouri:								
Kansas City	0	2	0		0	5	0	5
St. Joseph	1	0	1		0	1	4	2
St. Louis	1	13	5		0	1	4	2
North Dakota:								
Fargo	2	0	0		0	0	0	1
Grand Forks	0	0	0			2	0	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	1	1		0	1	0	5
Kansas:								
Topeka	0	0	2		0	4	0	2
Wichita	0	1	0		0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	2
Maryland:								
Baltimore	5	7	5		0	3	21	10
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	5	4	6	2	2	2	0	3
Virginia:								
Lynchburg	1	0	0		1	0	0	0
Norfolk	0	0	0		0	0	0	3
Richmond	0	2	1		0	0	0	1
Roanoke	0	0	0		0	0	0	0
West Virginia:								
Charleston	0	0	0		0	0	0	0
Wheeling	0	0	0		0	6	0	1
North Carolina:								
Raleigh	0	0	0		0	1	0	0
Wilmington	0	0	0		0	0	0	0
Winston-Salem	0	1	1		1	2	0	0
South Carolina:								
Charleston	0	0	1	6	0	2	0	1
Columbia	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	2	0		0	0	0	3
Brunswick	0	0	0		0	0	0	1
Savannah	0	0	0		0	0	0	2
Florida:								
Miami	1	0	0		0	0	0	1
Tampa	0	1	2		0	0	0	1

[1] Nonresidents.

City reports for week ended July 30, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington		0						
Lexington	0		1		0	0	0	2
Tennessee:								
Memphis	1	0	0		0	0	0	4
Nashville	2	0	0		0	0	0	1
Alabama:								
Birmingham	0	1	1		1	0	1	2
Mobile	0	0	0		0	0	0	0
Montgomery	0	0	1			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	1			0	0	
Little Rock	0	0	0		0	0	0	1
Louisiana:								
New Orleans	0	5	6	1	1	0	0	6
Shreveport	0	0	0		0	0	2	1
Oklahoma:								
Oklahoma City	0	1	1		2	2	0	1
Tulsa	1	0	0			1	0	
Texas:								
Dallas	0	2	14		0		0	2
Fort Worth	0	0	2		2	0	0	1
Galveston	0	0	0		0	0	0	0
Houston	0	2	6	1	0	0	0	0
San Antonio	0	1	0		0	0	0	4
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	0	0	0		0	2	0	0
Helena	0	0	0		0	0	0	0
Missoula	1	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	1
Colorado:								
Denver	10	6	3		0	2	11	2
Pueblo	1	1	0		0	0	0	0
New Mexico:								
Albuquerque	0	0	1		0	0	0	0
Arizona:								
Phoenix	0	0	1		0	0	0	1
Utah:								
Salt Lake City	7	1	0		0	2	5	3
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	3	1	0			1	4	
Spokane	4	0	0			0	0	
Tacoma	4	1	0		0	0	0	3
Oregon:								
Portland	1	2	0	1	0	6	2	0
Salem	0	0	0			3	0	
California:								
Los Angeles	14	18	12	20	2	9	6	9
Sacramento	3	1	0		0	1	0	1
San Francisco	10	5	1		0	10	1	8

City reports for week ended July 30, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	1	1	0	6	21
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	11
Manchester	0	0	0	0	0	0	0	0	0	0	10
Nashua	0	0	0	0	0	0	0	0	0	0	0
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	4
Burlington	0	2	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	19	24	0	0	0	10	2	2	0	47	146
Fall River	1	1	0	0	0	2	0	0	0	2	17
Springfield	1	7	0	0	0	2	1	0	0	1	27
Worcester	2	4	0	0	0	0	0	0	0	8	33
Rhode Island:											
Pawtucket	1	1	0	0	0	0	0	0	0	0	10
Providence	3	1	0	0	0	1	0	2	0	12	49
Connecticut:											
Bridgeport	1	2	0	0	0	0	0	0	0	7	24
Hartford	1	3	0	0	0	2	0	0	0	4	40
New Haven	1	1	0	0	0	1	0	0	0	12	32
MIDDLE ATLANTIC											
New York:											
Buffalo	6	9	0	0	0	7	0	2	1	16	101
New York	25	31	0	0	0	80	17	22	2	142	1,178
Rochester	3	16	0	0	0	0	0	0	0	7	55
Syracuse	2	3	0	0	0	1	0	0	0	31	40
New Jersey:											
Camden	0	4	0	0	0	2	1	0	0	0	30
Newark	5	4	0	0	0	2	1	0	0	26	70
Trenton	1	3	0	0	0	0	1	0	0	4	25
Pennsylvania:											
Philadelphia	19	31	0	0	0	11	4	6	0	47	325
Pittsburgh	10	12	0	0	0	6	3	2	1	51	102
Reading	0	0	0	0	0	1	0	0	0	12	24
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	5	0	0	0	3	2	4	2	4	133
Cleveland	11	12	0	0	0	13	1	1	0	56	187
Columbus	1	3	0	0	0	3	0	1	0	13	76
Toledo	2	3	0	0	0	6	1	1	0	15	63
Indiana:											
Fort Wayne	0	0	0	0	0	0	0	0	0	1	16
Indianapolis	2	1	3	0	0	4	1	0	0	7	----
South Bend	0	0	0	0	0	0	0	1	0	3	9
Terre Haute	0	1	0	0	0	0	0	2	0	0	20
Illinois:											
Chicago	40	39	2	0	0	28	5	5	1	100	556
Springfield	0	2	0	0	0	0	0	3	0	3	10
Michigan:											
Detroit	26	37	0	0	0	14	3	2	0	133	192
Flint	5	8	1	0	0	0	0	0	0	15	16
Grand Rapids	3	0	0	0	0	0	0	0	0	22	22
Wisconsin:											
Kenosha	0	0	0	0	0	0	0	0	0	9	9
Madison	----	0	----	0	----	----	0	0	----	17	----
Milwaukee	6	2	0	0	0	3	0	1	0	70	83
Racine	1	0	0	0	0	0	0	0	0	3	11
Superior	1	0	0	0	0	0	0	0	0	2	5

City reports for week ended July 30, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	5	0	0	0	0	0	0	0	0	16
Minneapolis	10	3	1	0	0	0	0	1	0	2	86
St. Paul	6	2	1	0	0	2	1	0	0	35	45
Iowa:											
Des Moines	1	1	1	0			0	0		0	29
Sioux City	0	0	0	3			0	0		4	
Waterloo	0	0	0	0			0	0		0	
Missouri:											
Kansas City	2	2	0	0	0	9	1	0	0	16	81
St. Joseph	0	0	0	0	0	1	0	0	0	2	38
St. Louis	7	1	0	0	0	12	4	6	1	8	224
North Dakota:											
Fargo	0	0	0	0	0	0	0	0	0	0	6
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen		2	1	0			0	0		3	
Sioux Falls		0	1	0			0	0		0	6
Nebraska:											
Omaha	1	3	1	0	0	1	0	0	0	6	47
Kansas:											
Topeka	0	0	0	0	0	0	0	0	0	14	37
Wichita	1	0	0	0	0	1	1	0	0	1	25
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	1	0	0	0	0	26
Maryland:											
Baltimore	6	8	0	0	0	13	5	1	0	69	143
Cumberland	0	0	0	0	0	0	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Col.:											
Washington	5	7	0	0	0	7	2	4	2	9	126
Virginia:											
Lynchburg	0	1	0	0	0	0	1	0	0	41	19
Norfolk		1	0	0	0	1	1	1	0	8	21
Richmond	2	3	0	0	0	3	1	4	0	0	45
Roanoke	0	1	0	0	0	0	0	0	0	1	16
West Virginia:											
Charleston	0	0	0	0	0	0	1	0	0	0	11
Wheeling	1	0	0	0	0	0	0	1	0	1	12
North Carolina:											
Raleigh	0	0	0	0	0	1	0	1	0	9	19
Wilmington	0	0	0	0	0	0	0	0	0	1	10
Winston-Salem	0	4	0	0	0	3	1	0	0	14	16
South Carolina:											
Charleston	0	0	0	0	0	5	1	7	0	0	28
Columbia	0	0	0	0	0	0	2	4	0	5	
Georgia:											
Atlanta	2	0	1	0	0	3	3	9	1	4	57
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	0	0	0	0	3	2	1	0	0	44
Florida:											
Miami		0	0	0	0	2	1	0	0	1	20
Tampa	0	0	0	0	0	0	0	0	0	0	17
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0		0				0				
Lexington		0		0	0	3		0	0	0	16
Tennessee:											
Memphis	1	0	0	0	0	7	9	5	0	7	106
Nashville	0	0	1	0	0	4	5	1	1	4	48

City reports for week ended July 30, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
EAST SOUTH CENTRAL—contd.											
Alabama:											
Birmingham	1	1	1	0	0	6	4	3	1	6	60
Mobile	0	0	0	0	0	1	1	0	0	0	17
Montgomery	0	0	0	0			1	4		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			1	0		0	
Little Rock	0	0	0	0	0	1	1	0	0	0	2
Louisiana:											
New Orleans	4	1	0	0	0	13	5	8	2	0	135
Shreveport	0	1	0	0	0	1	1	4	0	0	29
Oklahoma:											
Oklahoma City	1	3	0	0	0	2	4	0	0	4	48
Tulsa	1	0	0	0			1	5		6	
Texas:											
Dallas	2	0	0	0	0	2	3	2	0	8	62
Fort Worth		3	1	0	0	1	1	0	1	0	32
Galveston	0	0	0	0	0	4	0	0	0	0	7
Houston	1	1	0	0	0	4	1	0	0	0	60
San Antonio	1	0	0	0	0	6	2	1	0	0	67
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	5
Great Falls	0	1	0	0	0	0	1	1	0	0	3
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0	0	0	3	0	0	0	0	0	0	7
Colorado:											
Denver	3	5	0	0	0	7	1	0	0	17	62
Pueblo	0	0	0	0	0	1	1	2	0	8	8
New Mexico:											
Albuquerque	0	2	0	0	0	2	1	1	0	3	6
Arizona:											
Phoenix	0	0		0	0	2	1	0	0	0	
Utah:											
Salt Lake City	1	0	0	0	0	1	0	1	0	15	27
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	2	5	2	3			0	2		3	
Spokane	0	0	2	0			0	0		6	
Tacoma	1	2	2	2	0	0	0	0	0	5	28
Oregon:											
Portland	2	0	4	1	0	2	1	0	0	2	59
Salem	0	0	0	0				0		5	
California:											
Los Angeles	12	12	2	0	0	17	2	0	0	103	245
Sacramento	1	0	0	0	0	1	0	1	0	2	8
San Francisco	5	0	0	0	0	8	1	0	0	3	138

City reports for week ended July 30, 1932—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Springfield	1	0	0	0	0	0	0	0	0
Connecticut: [1]									
New Haven	0	0	0	0	0	1	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	3	3	2	1	0	0	12	3	0
New Jersey:									
Camden	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	0	16	1
Pittsburgh	1	1	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	1	0
Cleveland	0	0	0	0	0	0	1	1	0
Indiana:									
Indianapolis	7	1	0	0	0	0	0	0	0
Illinois:									
Chicago	1	0	0	0	0	0	0	1	0
Michigan:									
Detroit	1	0	0	0	0	0	1	4	0
Wisconsin:									
Milwaukee	0	0	0	1	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	0	0	0	0	0	0	0	2
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	1	0	0	1	0	0
District of Columbia:									
Washington	0	0	1	1	0	0	0	0	0
West Virginia:									
Charleston	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	1	0	1	1
Columbia	1		0		0		0	1	
Georgia: [2]									
Atlanta	0	0	0	0	0	0	0	2	1
Brunswick	0	0	0	0	0	1	0	0	0
Florida:									
Miami	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	1	0	0	1	0
Nashville	0	1	0	0	0	0	0	0	0
Alabama: [2]									
Birmingham	1	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	1	1	0	0	0	0	0	0	0
Houston [2]	0	0	0	0	0	0	0	1	0
San Antonio	1	0	0	0	0	1	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	0	0	0	0	0	1	0
California:									
San Francisco	0	1	0	0	0	0	0	0	1

[1] Rabies in man, 1 death at Hartford, Conn.
[2] Typhus fever: 4 cases: 2 cases at Savannah, Ga., 1 case at Mobile, Ala., and 1 case at Houston, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended July 30, 1932, compared with those for a like period ended August 1, 1931. The population figures used in computing the rates are estimated mid-year populations for 1931 and 1932, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 34,000,000. The 91 cities reporting deaths have more than 32,400,000 estimated population.

Summary of weekly reports from cities, June 26 to July 30, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 2, 1932	July 4, 1931	July 9, 1932	July 11, 1931	July 16, 1932	July 18, 1931	July 23, 1932	July 25, 1931	July 30, 1932	Aug. 1, 1931
98 cities	[3] 44	[3] 47	[4] 31	43	[4] 31	42	[4] 27	33	[4] 25	35
New England	204	96	46	60	60	65	29	50	50	53
Middle Atlantic	27	53	28	50	28	37	21	34	19	31
East North Central	25	49	23	41	25	50	20	39	16	38
West North Central	59	33	40	31	45	31	30	33	21	17
South Atlantic	[3] 28	[3] 12	31	18	29	24	22	28	31	32
East South Central	12	12	[4] 6	23	[4] 12	29	[4] 25	12	[4] 12	12
West South Central	89	27	106	61	63	47	46	24	89	61
Mountain	26	[3] 9	17	17	17	61	34	35	26	35
Pacific	34	51	11	41	23	51	63	16	25	47

MEASLES CASE RATES

98 cities	[3] 371	[3] 384	[4] 242	316	[4] 235	181	[4] 144	133	[4] 84	99
New England	630	402	558	351	395	317	247	209	115	132
Middle Atlantic	345	284	188	311	214	144	143	111	94	84
East North Central	641	768	409	527	419	316	239	214	131	153
West North Central	57	140	74	103	81	61	55	34	36	27
South Atlantic	[3] 154	[3] 311	104	259	63	107	29	83	31	47
East South Central	0	352	[4] 0	117	[4] 6	117	[4] 0	106	[4] 0	47
West South Central	53	24	33	27	23	17	23	14	10	10
Mountain	431	[3] 215	267	122	155	122	112	174	87	209
Pacific	227	149	185	182	145	123	80	125	40	87

SCARLET FEVER CASE RATES

98 cities	[3] 136	[3] 105	[4] 83	79	[4] 84	70	[4] 63	53	[4] 52	47
New England	280	188	201	142	165	149	156	111	105	82
Middle Atlantic	168	135	82	89	98	68	57	56	50	52
East North Central	167	122	110	90	91	106	66	69	66	52
West North Central	63	31	45	44	72	42	59	29	30	31
South Atlantic	[3] 58	[3] 55	43	49	39	34	33	38	47	43
East South Central	29	47	[4] 0	53	[4] 37	23	[4] 25	6	[4] 6	35
West South Central	36	41	10	34	33	34	43	44	10	20
Mountain	52	[3] 36	86	52	9	26	78	0	52	61
Pacific	53	47	46	49	57	12	38	12	36	16

See footnotes at end of table.

Summary of weekly reports from cities, June 26 to July 30, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931[1]—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 2, 1932	July 4, 1931	July 9, 1932	July 11, 1931	July 16, 1932	July 18, 1931	July 23, 1932	July 25, 1931	July 30, 1932	July 1, 1931
98 cities	[2] 2	[2] 6	[4] 1	2	[4] 1	3	[4] 1	3	[4] 2	2
New England	0	0	0	2	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	8	0	1	0	4	0	2	0	1
West North Central	2	10	2	4	0	4	2	10	6	11
South Atlantic	[3] 0	[3] 0	0	4	0	0	0	0	0	2
East South Central	6	23	[4] 6	6	[4] 0	0	[4] 0	6	[4] 0	6
West South Central	3	24	0	10	0	7	0	0	0	3
Mountain	17	[5] 0	43	0	26	0	0	0	26	0
Pacific	10	14	4	8	10	22	11	20	10	8

TYPHOID FEVER CASE RATES

98 cities	[2] 13	[2] 10	[4] 12	14	[4] 13	13	[4] 21	16	[4] 20	27
New England	5	10	5	2	7	12	5	10	12	12
Middle Atlantic	4	5	5	8	8	8	10	8	14	13
East North Central	10	3	10	5	13	5	13	5	12	12
West North Central	6	10	11	19	13	2	30	19	13	31
South Atlantic	[2] 42	[3] 10	24	28	18	47	43	69	63	77
East South Central	75	41	[4] 69	59	[4] 69	35	[4] 69	47	[4] 81	65
West South Central	56	71	46	81	33	58	125	10	49	169
Mountain	9	[5] 36	17	35	9	26	0	0	34	17
Pacific	4	4	4	6	10	6	11	27	6	4

INFLUENZA DEATH RATES

91 cities	[2] 3	[2] 3	[4] 2	3	[4] 2	2	[4] 3	1	[4] 2	3
New England	0	0	0	2	7	0	2	0	0	2
Middle Atlantic	4	1	2	4	1	0	4	1	1	4
East North Central	4	1	3	2	2	4	1	2	1	2
West North Central	0	9	0	0	0	3	3	0	0	0
South Atlantic	[2] 2	[3] 4	0	4	6	4	2	2	8	6
East South Central	13	19	[4] 7	6	[4] 0	0	[4] 0	0	[4] 7	13
West South Central	0	10	3	7	0	3	13	3	3	0
Mountain	0	[5] 9	9	0	9	0	0	0	0	0
Pacific	2	5	0	0	0	0	0	2	5	7

PNEUMONIA DEATH RATES

91 cities	[2] 53	[2] 64	[4] 49	59	[4] 45	47	[4] 49	44	[4] 48	48
New England	62	36	53	79	74	50	62	31	41	41
Middle Atlantic	61	67	63	59	46	63	49	55	46	59
East North Central	35	61	32	47	31	29	33	32	41	30
West North Central	64	77	35	88	41	71	70	53	87	47
South Atlantic	[2] 52	[3] 67	67	71	57	40	73	44	49	65
East South Central	31	83	[4] 27	51	[4] 20	45	[4] 34	45	[4] 48	51
West South Central	91	90	57	86	91	45	67	52	50	59
Mountain	60	[5] 72	43	61	52	35	78	17	52	44
Pacific	44	46	37	31	32	24	37	43	49	36

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1932, and 1931, respectively.
[2] Columbia, S. C., not included.
[3] Columbia, S. C., and Billings, Mont., not included.
[4] Covington, Ky., not included.
[5] Billings, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Two weeks ended July 23, 1932.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the two weeks ended July 23, 1932, as shown in the following table. Provinces not given in the table did not report any case of any disease included in the table.

Province	Cerebro-spinal meningi-tis	Influenza	Poliomy-elitis	Smallpox	Typhoid fever
Nova Scotia		7	1		1
New Brunswick					2
Quebec		1	21		40
Ontario	1		1		22
Manitoba	1			1	3
Saskatchewan				8	1
Alberta	1		2		5
British Columbia		1			2
Total	3	9	25	9	85

Quebec Province—Communicable diseases—Week ended July 23, 1932.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 23, 1932, as follows:

Disease	Cases	Disease	Cases
Chicken pox	17	Poliomyelitis	11
Diphtheria	20	Scarlet fever	28
Erysipelas	4	Tuberculosis	60
German measles	3	Typhoid fever	18
Influenza	1	Whooping cough	21
Measles	19		

CHILE

Plague-infected rats—Antofagasta.—On August 7, 1932, three plague-infected rats were reported confirmed bacteriologically at Antofagasta, Chile.

DENMARK

Communicable diseases—May, 1932.—During the month of May, 1932, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	14	Paratyphoid fever	22
Chicken pox	49	Poliomyelitis	2
Diphtheria and croup	162	Puerperal fever	11
Erysipelas	204	Scabies	516
German measles	5	Scarlet fever	160
Gonorrhea	738	Syphilis	75
Influenza	4,117	Typhoid fever	1
Lethargic encephalitis	14	Undulant fever (Bac. abort. Bang)	42
Measles	3,690	Whooping cough	2,908
Mumps	211		

LATVIA

Communicable diseases—April, 1932.—During the month of April, 1932, cases of certain communicable diseases were reported in the Republic of Latvia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	9	Paratyphoid fever	11
Diphtheria	41	Poliomyelitis	2
Erysipelas	31	Scarlet fever	37
Influenza	1,074	Tetanus	1
Leprosy	2	Trachoma	82
Measles	58	Typhoid fever	30
Mumps	132	Whooping cough	209

PANAMA CANAL ZONE

Communicable diseases—June, 1932.—During the month of June, 1932, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	10		Pneumonia		17
Diphtheria	8		Scarlet fever	1	
Dysentery (amebic)	1	1	Tuberculosis		21
Malaria	118	2	Typhoid fever	1	
Measles	18		Whooping cough	3	
Mumps	5				

TRINIDAD

Port of Spain—Vital statistics—June, 1931, 1932.—During the months of June, 1931 and 1932, certain vital statistics were reported in Port of Spain, Trinidad, as follows:

	June, 1931	June, 1932		June, 1931	June, 1932
Number of births	160	152	Deaths under 1 year	20	18
Birth rate per 1,000 population	28.3	26.2	Deaths under 1 year per 1,000 births	125.0	118.4
Number of deaths	93	93			
Death rate per 1,000 population	16.5	16.1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932				June, 1932				July, 1932				
					7	14	21	28	4	11	18	25	2	9	16	23	30
China:																	
Amoy	C										3		15	149	392	399	
	D										2		11	85	202	181	
Canton	C		2	1			1	1	2	49	330	298	203	96	37	22	6
	D						1		1	22	152	90	73	24	7	2	1
Dairen.[1]																	
Hankow	C	1		3		8					6	10	10	10	9		
	D			1		3							3	3	2		
Hong Kong	C											9	45	33	19	21	39
	D											9	18	33	8	7	16
Kwantung	C												P				
Macao	D															5	21
Nanking	C										123	131	104	111	78	104	
	D										45	34	22	21	8	19	
Newchwang	C											1	5				
	D												4				
Shanghai	C				11	11	8	40	92	90	130	276	314	217	318	411	
	D					1	1	1	10	9	23	11	20	21	16	35	
Swatow [2]	C						1			1		49	48	46			
	D											3	3				
Tientsin	C									3	16	22	19	9	7		
	D										5	3	3	2			
India	C	5,826	4,952	6,295	1,497	1,126	923	840	852	787							
	D	2,788	2,358	3,194	731	592	400	447	427	419							
Bombay	C	1												1	1		
	D	1												1			

[1] 119 cases, 71 deaths, in Dairen up to Aug. 6, 1932.
[2] Local unofficial reports included 159 deaths from cholera in Swatow, China, from June 10 to 30, 1932.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932				June, 1932				July, 1932				
					7	14	21	28	4	11	18	25	2	9	16	23	30
India—Continued.																	
Calcutta	C	1,118	162	350	174	228	141	100	79	63	106	132	143	129	76	.....	.....
	D	54	73	148	58	125	79	59	38	27	51	70	60	53	35	.....	.....
Chittagong	C	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	22	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madras	C	3	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rangoon	C	.....	.....	.....	.....	.....	1	.....	.....	.....	1	2	.....	.....	1	.....	.....
	D	.....	.....	.....	.....	.....	1	.....	.....	.....	1	1	.....	.....	.....	.....	.....
India (French):																	
Chandernagor	C	.....	.....	.....	11	.....	3	5	.....	.....	1	.....	.....	.....	.....	.....	.....
	D	.....	.....	.....	5	.....	2	5	.....	.....	1	.....	.....	.....	.....	.....	.....
Karikal	C	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pondicherry Territory	C	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pondicherry	C	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indo-China (see also table below):																	
Pnompenh	C	.....	.....	1	.....	.....	1	.....	1	.....	1	1	.....	.....	.....	.....	.....
	D	.....	.....	1	.....	.....	1	.....	1	.....	1	1	.....	.....	.....	.....	.....
Saigon and Cholon	C	1	1	2	1	1	2	2	2	2	1	1	1	.....	.....	.....	.....
	D	.....	.....	2	1	1	2	2	1	1	1	1	1	.....	.....	.....	.....
Japan:																	
Kobe	C	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....
Tokyo	C	.....	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	.....	.....	.....
Persia: Kouh Bezman	C	.....	.....	[1] 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philippine Islands:																	
Bulacan Province	C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
	D	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Capiz Province	C	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iloilo Province	C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
	D	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Laguna Province	D	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Siam	C	.....	1	2	.....	.....	.....	.....	8	8	.....	.....	.....	.....	.....	1	.....

Place		January, 1932	February, 1932	March, 1932	April, 1932			May, 1932			June, 1932		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30
Siam	C		1	2			8	8					1
	D		2	1			7	4					
Bangkok	C		2	1					2				
	D		1										
On vessels:													
S. S. Angora at Rangoon from Calcutta	C		1										
S. S. Narbada at Rangoon from Calcutta	C			1									
	D			1									
S. S. Shanghai Maru at Kobe from Shanghai	C						1						
S. S. President Wilson en route to Manila from Honolulu via Shanghai and Hong Kong	C									2			
	D									1			
Indo-China (French) (see also table above):													
Annam [1]	C		4					93	20	21			
	D		4					7	2	6			
Cambodia [1]	C	12	5	10	4	1	20	12	6		13	16	13
	D	6	4	5	3		8	2	1		10	12	7
Cochin-China [1]	C	5	7	9	3	6	18	11	30		17	17	17
	D	4	5	5	2	3	13	8	21		16	12	14
Laos [1]	C				7								
	D				3								

[1] A suspected case.
[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932				June, 1932				July, 1932				
					7	14	21	28	4	11	18	25	2	9	16	23	30
Argentina:																	
Cordoba Province[2]	C			2													
Rosario	D							1									
San Luis Province	C									1	1						
Belgian Congo	C							2									
British East Africa (see also table below):																	
Tanganyika	C		2						19	1							
	D								11								
Uganda	C	8	4	39	11	9	6	11	16	25	8	20					
	D	6	4	36	7	8	6	10	15	24	7	16					
Canary Islands: Palma Island—Los Lanos	C					1											
Ceylon: Colombo	C	4	3	2	1	3		2	5	3	3	2	5	1			
	D	3	3	2	1	1		2	5	3	3	2	5	1			
Plague-infected rats			1	1	5	2	2		4								
Chile: Antofagasta[3]																	
China:																	
Kwang Chow Wan	C		8														
	D		8														
Shensi Province	C	P															
Dutch East Indies:																	
Java—Tegal	C	1															
Java and Madura	D	459	362	365	70	62	76	71	72								
West Java	C	141	213	239			41	44	45	63	51						
	D	139	213	237			41	43	45	63	51						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C		2		1	2	1	8	1	2		1	3	1		1	
	D					2		1	2	1	1		1	1			
Assiout	C																1
Beheira	C			1	2				1	1						1	1
	D			1	3				1							2	
Beni Suef	C			37	2												
	D			8	3												
Gharbieh	C								2		1						
	D									1							
Minieh	C		3													1	
	D		3													1	

Hawaii Territory:																	
Hawaii Island—																	
Hamakua—																	
Honokaa	C	2															
	D	2															
Plague-infected rats		1															
Kukaiau—Plague-infected rats								1	1								
Maui Island—																	
Makawao [4]	C	1															
	D	1															
Plague-infected rats		4															
India	C	8,593	9,724	5,197	684	474	256	259	133	101							
	D	4,970	5,543	3,219	505	360	203	192	91	70							
Bassein	C	4	9	5	2					2		1		2			
	D	4	7	4	2					2		1		1			
Bombay	C	5	8	19	2	2	1		1								
	D	5	6	15	1	2	1		1						1		
Plague-infected rats		109	117	122	25	21	1	11	3		9	11	5	5	5	6	
Madras	C			[5] 1													
	D			1													
Madras Presidency	C	70	158	60	18	5	6	11	13			13					
	D	47	86	24	4	4	1	2	8			2					
Rangoon	C	9	4	7				1				1	2				1
	D	8	4	6									2				1
Plague-infected rats		2	8	5		2		1		1		2	2	2	1		
Indo-China (see table below).																	
Iraq: Baghdad	C	3										1				1	
	D	1															
Madagascar (see table below).																	
Morocco	C													5			
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	1	7														
	D		3														
Southwest Africa. [6]																	
Syria: Beirut	C			2							1		2			1	1
Union of South Africa: Orange Free State	C	P	P														
	D		10														
United States: California—Los Angeles—Plague-infected rats				1	2					1							
On vessel:																	
Steamship Columbia, at Naples from Barcelona—Plague-infected rats												2					

[1] Including plague in the United States and its possessions.
[3] 10 cases of bubonic plague were reported in Cordoba Province, Argentina, in January, 1932. They were distant from railroad and 500 kilometers from ports.
[3] 3 plague-infected rats at Antofagasta, Chile, Aug. 6, 1932.
[4] 1 death from plague Aug. 1, 1932, was reported in Makawao District, Maui Island, Hawaii Territory.
[5] An imported case.
[6] 80 cases of plague with 15 deaths were reported in Ovamboland, Southwest Africa, up to Apr. 30, 1932. Antiplague measures have been taken.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1932	February, 1932	March, 1932	April, 1932	May, 1932	June, 1932
British East Africa (see also table above): Kenya	C	17	33	22	18	11	30
Ecuador:							
Province—							
Chimborazo	C	8	13	-------	6	10	2
Loja	C	11	-------	-------	-------	-------	-------
Indo-China	C	17	P	P	9	2	1
	D	9	-------	-------	6	1	1
Madagascar:							
Province—							
Ambatolampy	C	23	40	25	-------	-------	-------
	D	23	38	25	-------	-------	-------
Ambositra	C	166	90	81	19	-------	-------
	D	152	81	67	17	-------	-------
Antisirabe	C	53	45	54	21	-------	-------
	D	51	45	53	21	-------	-------
Mevatanana	C	-------	-------	4	-------	-------	-------
	D	-------	-------	4	-------	-------	-------
Madagascar—Continued.							
Province—Continued.							
Miarinarivo	C	15	13	9	6	-------	-------
	D	15	12	9	6	-------	-------
Moramanga	C	13	9	3	-------	-------	-------
	D	13	9	3	-------	-------	-------
Tananarive	C	203	148	71	42	-------	-------
	D	196	140	70	40	-------	-------
Peru [1]	C	11	2	1	2	5	2
	D	8	2	-------	-------	-------	-------
Senegal:							
Dakar [2]	C	-------	-------	10	-------	-------	-------
	D	-------	-------	5	-------	-------	-------
Louga [2]	C	-------	-------	-------	-------	3	1
	D	-------	-------	-------	-------	2	1
Rufisque [2]	C	-------	-------	-------	-------	3	21
	D	-------	-------	-------	-------	3	17
Yombel [2]	C	-------	-------	9	-------	-------	-------
	D	-------	-------	5	-------	-------	-------

[1] The reports of plague in Libertad Province, Peru, as published in previous issues of Public Health Reports, are erroneous. The Chief of the Peru Antiplague Service states that cases of plague have occurred in Peru since Jan. 1, 1932, as follows: January, 11 cases; February, 2 cases; March, 1 case; April, 2 cases; May, 5 cases; June, 2 cases.
[2] Reports incomplete.

SMALLPOX

SMALLPOX

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932 7	May, 1932 14	May, 1932 21	May, 1932 28	June, 1932 4	June, 1932 11	June, 1932 18	June, 1932 25	July, 1932 2	July, 1932 9	July, 1932 16	July, 1932 23	July, 1932 30
Aden	C		1														
Algeria:																	
Algiers	C									1	1						
Constantine Department	C			2	1		1										
Philippeville	C			1													
Southern Territories	C	2															
Brazil:																	
Porto Alegre (alastrim)	C	19	5	8	2	2					3	2	3				
	D		1												2		
Santos	C																
British East Africa: Tanganyika	C	5	P		79	11			19		4						
	D	2							11		1						
British South Africa:																	
Northern Rhodesia	C									4							
Southern Rhodesia	C		4	7													
Canada:																	
British Columbia	C	17	9									[1]1					
	D	9	3														
Manitoba	C			1												[1]1	
Nova Scotia	C	1															
Ontario	C	21	4	6	1			23						[1]1			
Quebec	C	8										[1]1					
Saskatchewan	C	30	6	8	3	1	3	6		[1]1		[1]2		[1]3		[1]6	
China:																	
Amoy	C	121	45	17	3		2	3				1					
	D	44	25	11	2		2	2				1					
Canton	C	44	79	81	19	9	5	9	1	3	3	3	1	1	1		
	D	1	7	1	1												
Foochow	C	P	P	P		P		P		P		P		P			
Hankow	C	4	5	3	1	1	3										
	D	1															
Hong Kong	C	51	45	55	7	9	7	1	4	5	2	1	1		1		
	D	23	28	20	7	6	2	2	4	6	1	1	1			1	
Manchuria: Dairen	C	1	16	8	1		1			2	3						
	D			2	1		1			2	1						

[1] These cases of smallpox are for periods of 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932 7	14	21	28	June, 1932 4	11	18	25	July, 1932 2	9	16	23	30
China—Continued.																	
Shanghai	C	167	102	90	16	6	5	6	3	3							
	D	467	45	35	6	5		2	1	2							
Swatow	C	1															
Tientsin	C	2	8	2	1				2								
	D	1	1														
Chosen (see table below).																	
Dahomey	C		6	5	2					15		9					
	D		1	1						6		1					
Dutch East Indies	C													6			
Egypt:																	
Alexandria	C		1			1	1				1				1	3	3
Cairo	C														1		1
Suez	C	2	20	4	1												
	D		3														
Finland	C							1									
Gold Coast (see table below).																	
Great Britain:																	
England and Wales	C	258	273	315	68	76	56	68	49	36	25	30	22	35	37	10	
London	C	136	129	137	41	39	25	29	49	18	15	18	19	28	27	5	
London and Great Towns	C	203	236	257	59	60	47	52	37	31	37	23	21	32	32	10	
Greece (see table below).																	
Guatemala (see table below).																	
Honduras: [1]																	
Ceiba	D	1	2	2													
Puerto Castilla	C	4		4			1	P			2				1	P	
Tegucigalpa	C	5															
Tela	C		2	2				1									
Trujillo	C	35															
	D	5															
India	C	9,709	12,040	13,716	4,230	3,388	2,771	2,879	3,418	2,623							
	D	1,806	2,234	2,895	996	796	676	815	812	620							
Bassein	C			1													
	D			1													
Bombay	C	23	27	25	10	12	2	12	7	4	5	6	5	3	9	9	
	D	10	12	10	2	4	1	5	4	2	3	4	3	3	6	8	
Calcutta	C	102	149	133	17	35	22	19	15	16	21	12	12	12	10	6	

Calcutta	C	102	159	133	17	35	22	19	15	16	21	12	12	12	10	6	
	D	54	115	99	12	29	16	10	17	14	8	8	9	10	8	6	
Chittagong	C		2			2											
	D		1			1											
Cochin	C	9	3	1												2	
Karachi	C	23	19	29	4	5	3	4	7	5	3	5	1				
	D	8	8	9		2	1	3	1	1	1	1					
Madras	C	15	51	58	17	10	10	10	3	8	5	6	8	8	6	13	
	D	4	16	11	2	4	2	3		3	2	3	2	3		2	
Moulmein	C	4	7	1						5							
Negapatam	C	1	1				1	2									
	D						1										
Rangoon	C	418	606	260	18	26	13	9	6	10	5	8	8	7	9	2	
	D	127	179	88	9	11	6	2	4	4	1	2	2	1	3		
Tuticorin	C	36	14	5	4						1						
	D	8	9	3	5						1						
Vizagapatam	C	3	2										1				
India (French):																	
Karikal	C	4	19	21	2	4	1	4		2							
	D	4	9	12	2	2	1	2		1							
Pondicherry Territory	C	20	29	22	3	5	28	11		4	2	1	3		5	3	
	D	20	20	19	3	5	28	11		4	2	1	3		5	3	
Indo-China (see also table below):																	
Pnompenh	C	2	1														
Saigon and Cholon	C	145	212	113	12	88	8	5	3	3	3	9	2		2	2	
	D	85	174	101	11	7	7	5	3	3	2	9	2		2	2	
Iraq:																	
Baghdad	C	4	20	27	4	7	10		14	9	3	1			1	4	3
	D	4	10	13	2	3	3		6	4	2						1
Basra	C	2	11	4	1	1	4	2	2	4	2			4			
	D			4		1	1	1	1		1			1	1		
Ivory Coast (see table below).																	
Japan:																	
Kobe	C	1	2	1		1	7	2									
	D		1					1									
Nagasaki	C				1	4	4	4	1	1	1						
Osaka Prefecture [1]	C			93	34	48											
Osaka	C					1											
Taiwan	C	58	1	1													
Mexico:																	
Chihuahua	D	3	1	1			1			5						1	2
Durango	D			1													
Jalisco (State)—Guadalajara	D		1	2		1	1		1	1							
Merico City and surrounding territory	C	33	6	16	3	2	3	9	4	7	2	5	6	2	5		
	D	1		2		1									1		
Monterrey	C	8	1	2	1			1									
Saltillo	D						1	2	2				2	1			
San Luis Potosi	D	2	3	2	1			1		1							
Torreon	C	2	2	3		1	1	1	1	1	1						
	D	3	2	3		3			1			1					

[1] 590 cases of smallpox with 15 deaths were reported in Honduras from July, 1931, to Feb. 16, 1932.
[1] 264 cases of smallpox were reported in Osaka Prefecture, Japan, from Mar. 1 to May 28, 1932.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932 7	14	21	28	June, 1932 4	11	18	25	July, 1932 2	9	16	23	30
Morocco (see table below).																	
Nigeria	C	46	750	116	.....	939	.....	104	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	2	111	19	.....	316	.....	17	.....	.....	.....	.....	.....	.....	.....	.....	.....
Palestine	C	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Poland	C	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Portugal:																	
Lisbon	C	50	38	26	10	5	8	6	2	5	6	12	1	2	3	4	.....
Oporto	C	14	14	21	3	5	8	8	4	9	8	2	8	7	10	4	.....
Salvador	C	85	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sarawak	C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....
Siam	C	.....	2	.....	.....	.....	.....	1	8	1	.....	.....	.....	.....	.....	.....	.....
Sierra Leone [4]	D	.....	.....	.....	.....	.....	.....	.....	4	1	.....	.....	.....	.....	.....	.....	.....
Straits Settlements	C	6	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	2	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	.....
Sudan (Anglo-Egyptian)	C	8	4	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syria (see table below).																	
Tunisia: Tunis	C	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Turkey (see also table below): Istanbul	C	1	.....	1	.....	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Union of South Africa:																	
Cape Province	C	.....	.....	P	P	P	P	P	P	.....	.....	P	.....	.....	.....	.....	.....
Orange Free State	C	.....	.....	P	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Transvaal	C	.....	P	P	P	.....	P	P	P	P	.....	.....	.....	.....	.....	.....	.....
Upper Volta	C	.....	.....	.....	.....	.....	11	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
On vessels:																	
S. S. Frauenfels at Suez from Calcutta	C	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. S. MacGillivary at Suez from Rangoon	C	.....	[5] 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. S. Tainui at Southampton from New Zealand	C	.....	[5] 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. S. Glenbank at Suez from Aden	C	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S. S. Tuscania at Suez from Bombay	C	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....

[4] From Mar. 6 to June 11, 1932, 814 cases of smallpox, with 11 deaths, were reported in Sierra Leone.
[5] A suspected case.

Place		January, 1932	February, 1932	March, 1932	April, 1932			May, 1932			June, 1932	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Gold Coast	C	2								2		
	D	1										
Indo-China (see also table above)	C	309	660	727	175	247	146	211	78		61	130
	D	148	231	342	80	97	64	46	37		27	41
Ivory Coast	C										19	
	D										1	
Syria: Beirut	C	5			1		1					

Place		January, 1932	February, 1932	March, 1932	April, 1932	May, 1932	June, 1932
Chosen	C	1	6	30	55	55	
	D		3	9	5	8	
Greece	C			1	8		
Guatemala	C	5					
	D	1					

Place		January, 1932	February, 1932	March, 1932	April, 1932	May, 1932	June, 1932
Morocco	C	488	368	308	101	101	27
Turkey (see also table above)	C	31	22	2			
	D	1	1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 10–Feb. 6, 1932	Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932 7	14	21	28	June, 1932 4	11	18	25	July, 1932 2	9	16
Algeria:																
Algiers	C	1	3	7	40	7	23	31	.....	8	5	5	12	33	.....	.....
Constantine Department	C	7	.....	7	.....	.....	.....	.....	.....	1	.....	.....	.....	9	.....	69
Geryville	C	7	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oran	C	.....	.....	1	.....	.....	.....	.....	4	10	.....	.....	.....	.....	.....	.....
Bulgaria	C	44	66	44	45	10	7	16	5	4	5	3	3	3	.....	.....
	D	6	6	2	9	.....	2	1	.....	1	.....	1	.....	.....	.....	.....
Chile:																
Antofagasta	C	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....
Iquique	C	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Santiago	C	.....	.....	1	1	.....	.....	.....	1	1	5	1	1	.....	.....	.....
China:																
Hankow	C	.....	.....	5	.....	.....	1	.....	1	.....	.....	1	.....	1	.....	.....
Swatow	C	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tientsin	C	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chosen (see table below).																
Colombia: Cali	D	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Czechoslovakia (see table below).																
Egypt:																
Alexandria	C	.....	1	.....	.....	.....	.....	.....	1	5	2	.....	1	.....	.....	.....
Beheira	C	.....	70	46	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	16	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dakahlia	C	.....	.....	.....	1	.....	.....	60	.....	.....	.....	.....	.....	.....	.....	.....
Gharbieh	C	.....	12	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	D	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Said	C	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	2
Provinces	C	43	333	676	222	27	38	38	60	139	.....	.....	.....	.....	.....	.....
	D	3	25	49	43	6	1	1	.....	10	.....	.....	.....	.....	.....	.....
Greece (see table below).																
Guatemala (see table below).																

Irish Free State:																	
Roscommon County—																	
Leitrim	C							1									
	D							1									
Roscommon	C									1							
Lithuania (see table below).																	
Mexico:																	
Mexico City, including municipalities in Federal District	C	25	20	7	11	2		5	1	2	4		1	3	3	3	
	D	9	12	4	3				2		1		1	1	1	1	
San Luis Potosi	D		1	1													
Morocco	C	6	59	29	34	3	7	7	2	13	5	4	4	5			
	D		6	6	1						3						
Palestine	C	3	1			1				2	1		1		1		
Paraguay: Asuncion	D		1														
Persia	C								123	69							
	D								4	5							
Poland	C	265	215	255	414	70	106	106	98	83	77	21	23	38	30	18	
	D	10	21	22	39	7	4	5	9	3	4	1	6	3	3	1	
Portugal:																	
Lisbon	C									2	5						
Oporto	C	1	1		10	3				4							
Rumania	C	264	296	270	252	61	60	53	60	40							
	D	13	28	31	21	8	8		7	5							
Tunisia: Tunis	C	1	24	81	77	26	15	13	1	13	9	6			3	2	
	D		3	8	4												
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P	P		P	P				
Natal	C		P		P	P					P	P	P				
Orange Free State	C	P	P	P	P	P	P	P				P	P				
Transvaal	C	P	P							P							
Venezuela: Caracas (see table below).																	
Yugoslavia (see table below).																	

Place		January, 1932	February, 1932	March, 1932	April, 1932	May, 1932	June, 1932
Chosen: Seoul	C		5	4			
	D		1				
Czechoslovakia	C	1			1	5	
Greece	C	4	4	7	1		4
Guatemala	C	18	2	42	5		19
	D	3		3		8	3
Lithuania	C	21	10	32	25	13	16
	D	3	3	3	5	1	

Place		January, 1932	February, 1932	March, 1932	April, 1932	May, 1932	June, 1932
Turkey	C	14	22	6	1		
	D	3	1	3			
Union of Socialist Soviet Republics	C	8,670	9,017	9,765			
Venezuela: Caracas	D	2					
Yugoslavia	C	11	26	5	29	34	
	D		2	1		6	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 7–Mar. 5, 1932	Mar. 6–Apr. 2, 1932	Apr. 3–30, 1932	Week ended— May, 1932 7	14	21	28	June, 1932 4	11	18	25	July, 1932 2	9	16
Bolivia[1]															
Brazil:															
Bahia State—Esplanada	C				P										
Ceara State	C			1											
	D			1											
Espirito Santo State	C		2	1											
	D		2	1											
Santa Teresa (about 56 miles from Victoria)	D	1													
Parahyba State	C											1			
	D											1			
Pernambuco State	D			1									1		
Dahomey: Porto Novo	C		1												
	D		1												
Gold Coast:															
Avudua	C		1	1											
Cape Coast	C		P												
Tamale	C		1												
Yapei	C	1													
Nigeria	C							1							1
Upper Volta	C														1
	D														1

[1] Indirect reports show cases suspected to have been yellow fever in southern Bolivia during April, 1932.